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The Loquacity of Technical Papers

THE flood of scientific and technical literature that supposedly threatens to engulf the chemist and the engineer, must, if Biblical precedent be any guide, be due to our inherent sinfulness. Certainly it is to some degree our own fault. Mr. Robert Robertson, president of the Institution of Gas Engineers, has, like Noah, attempted to " build him an Ark that he may escape the inundation."

He has quoted the writer of Ecclesiastes: " Of making many books there is no end; and much study is a weariness of the flesh," to show that this is no new problem but that mankind had the same complaint 3,000 years ago.

Mr Robertson agrees that the Transactions of technical bodies, *if assimilated*, are of the utmost value to any industry, but he points out that many technical men are interested in several technical societies and that the sum total of their transactions, added to that of the technical Press, makes so formidable a mass of technical literature that the task of keeping up to date is almost beyond the working engineer or chemist. Much of what is written, he says, is mere repetition of what has already been written again and again. The scientist is brought within this condemnation, for his communications "frequently relate to investigations concerning highly complex processes which the general practitioner may have difficulty in following and may not even have time to read." He insists that if an account of work of this character is to be of practical value, it should be presented in an abbreviated form which will be readily understood and easily assimilated by the general practitioner. In brief, Mr. Robertson's "Ark of Refuge" is greater compression by the authors, better selection of material, and the presentation of carefully edited and suitably indexed contributions of permanent value by the technical Press printed on separate detachable pages.

The applause which greeted Mr. Robertson's complaint showed how very real is this problem. It must be recognised that technical literature originates from many causes. There is first the research worker who wishes to publish his results to the world; he believes all too frequently that every single observation that he has made should be recorded, and from the viewpoint of other research workers, he is right. Nevertheless, the extreme length and dullness of many, even of most, scientific papers must effectually prevent them from being read by the technical men who should put them into practice. It is here that the technical Press performs already the duty that Mr. Robertson would thrust upon it. When scientific investigations appear to lead to practical applications of importance, the technical Press usually puts them forward in just that semi-popular and easily assimilable form that Mr. Robertson desires and in so doing performs work which is generally agreed to be of high value.

Secondly, there is the engineer who is either desirous of describing some new development or is induced to do so. The engineer, like his scientific colleague, is rarely a man of literary ability, and nearly all contributions under this heading would be greatly improved by skilful re-writing and compression. Many contributions should never see the light of day because they contain nothing new and little that is useful. A widespread cause of verbiage is the desire on the part of technical bodies to hold meetings at regular intervals throughout the winter, which involves persuading people, who would not otherwise do so, to read papers. These papers must usually be of a sufficient length to occupy the time allotted and may thus have to be unduly padded. The "discussions" on these papers are often printed *in extenso*, whereas they could be usefully " pruned "; too often chairmen of technical bodies call on a list of speakers by name irrespective of whether they have anything useful to contribute.

There is also the type of publicity which by articles and in similar ways brings forward new plant or processes for the consideration of industry with the object of creating demand. We believe that this type of paper is now frowned upon by scientific and technical bodies, but being of considerable value both to industry and to the vendor, it has its place in the form of articles in the technical Press.

Finally, let it not be forgotten that because technical men do not always understand the implications of purely research results, and because the volume of literature is such that they cannot always find time to study what is written—some technical men make little attempt even to read what is written!—reproduction in simplified form and reiteration are essential. Anyone who has published a piece of original research knows well that before it is put into practice it must be explained in simple language.

". . . figures were given showing that one estimate indicated that three-quarters of a million worthwhile articles or papers were published each year in 18,000 journals. Stringent steps are needed to cope with such a vast problem as the one of searching for information under such conditions."

—The late Mr. W. P. Dreaper.

NOTES AND COMMENTS

Petroleum Reserves

THE immediate potentialities of synthetic processes for the production of oil from coal depend to no small extent upon the likelihood or otherwise of reasonably early exhaustion of petroleum deposits sufficient to cause the price to increase. Undoubtedly if this occurred much of the usage of oil would be transferred to solid fuel, as for example, the use of anthracite or semi-coke for driving heavy road transport vehicles. Nevertheless, there would be required sufficiently large quantities of petrol, lubricating oils and other oils to make chemical processes highly important and to cause the creation of a new chemical industry on a vast scale. Statements have recently been published and reiterated to the effect that known reserves of petroleum are only sufficient to last 15 years, thus by inference leading to the belief that within that time the synthetic processes might have become not only economic but essential. Mr. Robert Byron, of the Petroleum Information Bureau, has just pointed out that the exploration activities of the petroleum industry are so regulated as to keep not more than 12 to 14 years' supply of oil in sight, this being regarded as "working stock." He believes that the possible exhaustion of the oil supplies is very far ahead because new methods of geological survey are revealing oil in areas formerly regarded as unproductive, because no one knows how deep oil-bearing rocks may be found or how deep we may be able to drill, and finally because the greater part of the earth's surface containing potentially oil-bearing rocks is still unexplored.

Synthetic Oil Processes

THE position of the chemical technologist who wishes to assess the synthetic processes in terms of probable oil prices is indeed unhappy. He is faced on the one hand with the petroleum industry denying that there is a least sign of oil shortage, and on the other with the statements that the U.S.A. is so far facing oil exhaustion that it is likely to become an importing country instead of exporting vast quantities of oil to less favoured lands. He sees that the most intense search in certain oil-thirsty countries such as Great Britain, Germany, Italy and France has failed to reveal any sign of oil, and he will thus wonder how far the "greater part" of the earth's surface really contains potentially oil-bearing rocks. Undoubtedly there yet remain great oil-fields to be discovered, or so it is safe to suppose, but with the rapid increase in the consumption of oil, there is known to be an intense search for oil the results of which do not seem to the uninitiated to keep pace with consumption. Nevertheless, the hard-headed will be chary of building synthetic oil plants just yet on the assumption that a petroleum shortage is in sight.

Hydrogenation Process in Italy

A NEW development of the hydrogenation process has taken place in Italy in which two plants for treating oils derived from crude Albanian petroleum have been erected at Bari and Livourne, these plants working under a pressure of 300 atmos. and at a temperature of 500 deg. C., the oils being, of course, in the vapour phase. Albanian petroleum only yields 40 per cent. of crude, high-sulphur petrol by the usual methods of distillation and cracking. It is claimed that by distilling the petroleum, cracking the residue and hydrogenating the oils obtained from both the distillation and cracking plants, there can be produced from these two plants, some 240,000 tons of petroleum annually, 100,000 tons of high-octane petrol, 60,000 tons of lubricating oil, 14,000 tons of paraffin, and 6,000 tons of refined sulphur derived from the hydrogen sulphide liberated by hydrogenation. Thus hydrogenation, applied to petroleum of inferior quality, improves the products, and assists refining, particularly in the elimination of sulphur. The hydrogen needed for the process is derived by treating the methane in the permanent gases with steam in presence of a catalyst at 800 deg. C., the carbon monoxide thus formed being converted into carbon dioxide with liberation of more hydrogen by treatment with further supplies of steam at 500 deg. C.

The Training of Physicists

INDUSTRIALISTS are not altogether happy about the introduction of the modern product of the physical schools into industry, if one may judge from editorial comments in a recent issue of *Metals and Alloys*. It is suggested that physicists are trained in the most abstruse branches of the subject, so that they will become "professors of high-brow physics that they may train other men to be, in their turn, professors of a similar type. Inbreeding, over-production and gross neglect of everyday engineering physics has resulted." It is stated that in the last decade or so, many men have been permanently spoiled by their training before graduation in physics of a type which may be needed for passing the present examinations, but for which the student is not fitted. Such men have not had adequate training in the type of physics that industry needs. The conclusion is reached that the more discussions that are held on the down-to-earth type of physics, the better is the chance for much needed improvement in a situation that vitally concerns the future of metallurgical engineering. How far these strictures, which were published in an American journal, are true in this country is uncertain. It is a fact that one sees fewer physicists in industry than there should be and the chemist still appears to be ubiquitous. The real solution of the difficulty in many instances may be to avoid taking honours in physics, but to be content with taking the much more practical "pass" degree with an adequate grounding in mathematics. Not infrequently the works manager finds a knowledge of physics and particularly the physics of heat, of more value than Honours Chemistry.

New Process in Clay Technology

THE many types of natural colloidal clay, known generally under the term "bentonite," permits it to be used for a number of purposes in industry. The latest of these, somewhat unexpected and altogether novel, is due to the work of Dr. Hauser, a technologist well known in the rubber industry. He has discovered a method of transforming very pure bentonite into a transparent form having physical properties analogous to those of mica. The new product is of considerable value for making fireproof packages and as an impermeable coating for paper. The process consists in rigorously controlled drying of the bentonite gel having an appropriate concentration of water, under such conditions that the fine colloidal particles agglomerate in such a way as to form fibrils which interlace to produce a window-structure analogous to that of paper. The diverse uses to which natural or manufactured products may be put and the changes in form to which skilled technique may subject them, help to give much of its fascination to applied chemistry, and incidentally make it at all times problematical how long any given product will retain its market.

Britain's Trade Recovery

AN encouraging note is struck by the President of the Board of Trade in the August issue of "Home and Empire." In five months the number of insured persons in employment in Britain has risen by no less than 730,000 and the figures for various industries, including retail trade returns, all tell a story of recovery. While the huge expenditure on rearmament is largely responsible, the importance of this factor should not be exaggerated. Replying to pessimists, Mr. Oliver Stanley points out that if our present recovery were entirely due to unproductive expenditure, we should have little time or productive capacity to spare for the manufacture of goods required by people abroad. Actually, for the first six months of the year, our exports slightly exceeded in value the total of the same period last year. A notable feature of recent economic history has been that, whenever international tension has slackened, normal trade has shown immediate signs of reviving. Lack of confidence is due to political fears rather than to economic fears, and industry is ready to expand as soon as Europe becomes more settled.

"Live Our Normal Lives"

MEANWHILE, the President of the Board of Trade urges that we should all carry on our normal business to the utmost of our ability. "I should like to appeal to the ordinary man," Mr. Stanley concludes, "whether acting as consumer or producer, not to act as if war were inescapable and there were no longer any point in making the ordinary provisions and plans on which the trade of the country depends. National Service is making demands on all of us, and it is the duty of each of us to meet those demands to the best of our ability. This duty done, we should try to live our normal lives. A widespread postponement of buying can only undermine trade and employment. The few pounds saved will be of little use should war come upon us. If so far as possible we live our normal lives, we can be confident that we are helping to maintain the trade and industry of the country, upon which depend our strength in war and our prosperity in peace."

NATIONAL SERVICE

Special Offer to Subscribers

TO enable subscribers to THE CHEMICAL AGE called up for service under the Military Training Act to keep in touch with the trade, the proprietors have pleasure in announcing the following concession:—

To all militiamen, naval reservists, territorials, or others called away from business for National Service, who are paid subscribers to THE CHEMICAL AGE, or are employees of a paid subscriber, the journal is offered free during their period of service.

Eligible readers wishing to take advantage of this offer should, as soon as they receive their calling up papers, write to the Circulation Manager of THE CHEMICAL AGE stating the address to which they wish the journal to be sent.

Subscribers, some of whose employees have already been called up, should notify the Circulation Manager, giving unit and station, and the paper will be sent on each week without charge during the period of service.

The Rumanian Chemical Industry

A Gradual Expansion

THE Rumanian chemical industry has been expanding gradually during recent years and imports of chemicals and allied products have declined from a total of $11,500,000 in 1934 to $8,900,000 in 1938, according to preliminary statistics reported by the American Consulate, Bucharest. On January 1, 1938, there were 233 chemical factories, producing certain industrial chemicals and paints, varnishes and lacquers, fertilisers, soap, starch, glue, explosives and miscellaneous allied products. Most of these undertakings are small with inadequate financial means and producing low or medium grades of merchandise for domestic consumption. Endeavours to manufacture better grades have failed, owing to inadequate equipment and lack of skilled labour.

Taking into consideration the fact that the consumption of chemicals during the last 5 years has increased greatly, it can be safely stated that the local industry is supplying most of the demand. The textile, food, paper and to a lesser degree the leather, glass and construction materials industries are the major chemical consuming industries. The textile industry has grown noticeably during the last few years, and production is amply covering the domestic demand. The food industry has progressed until it can supply the entire demand and also export. The domestic glass industry is absorbing a large quantity of chemicals, both of local and foreign origin; the paper and printing industry also is an important consumer.

New Factories Established

In addition to the old and well-known factories, "Marasesti," "Nitrogen," "Uzinele Solvay," "Phœnix," and a few others, many chemical factories have been established during the last two years and many have added modern installations. Among the newly-established undertakings are: "Intreprinderile Closani" tanning materials; "Romcar," lamp black; "Romochim," various industrial chemicals; "Moara Sistematica si Fabrica Chimica," industrial chemicals; "Kast Ehinger," printing inks; "Laboratorul Lutetia," pharmaceutical products; "Ipcasar," industrial chemicals "Bancgaz," chemical specialities; and "Industria Chimico Technica."

The following concerns have established new branches: "Marasesti" has started the manufacture of sodium bisulphite, metabisulphate of potassium, sulphuric acid, arsenious acid, pure chemical magnesium compounds and other allied products; "Uzinele Chimice Romane" has added a section for the manufacture of gas masks and rubber articles needed by the military authorities; "Industria Lutului" has established a branch for the manufacture of ultramarine, lithopone, mineral earth pigments, etc.; "Hermes" has opened a branch for the manufacture of glycerine, both technical and dynamite grades, hydrogen and oxygen; "Societatea Nationala de Gas Metan" has opened a factory for the manufacture of lamp black (this company owns another lamp black factory); "Speciala" S.A. din Lovrin has imported a complete installation for the manufacture of starch, powder, glue, dextrine and allied products; and the Phœnix factory of Baia Mare has started the manufacture of superphosphate, zinc sulphate and refined silver.

In spite of the expansion of the Rumanian chemical industry, it cannot yet supply all requirements, and imports average from $8,000,000 to $10,000,000 annually. The import market is largely dominated by Germany.

AN impending merger is announced which will affect the Soc. des Matières Colorants de Saint-Denis and the Soc. des Produits Chimiques de Saint-Denis. Both concerns have been established in Saint-Denis since 1881, the latter being chiefly engaged in the manufacture of acids and fertilisers while the main products of the Soc. des Matières Colorants, apart from dyestuffs, are vulcanisation accelerators, aniline, naphthol, naphthylamine and zinc salts.

LARGE SCALE INDUSTRIAL UNITS

"Not Only Desirable But Necessary"—Lord McGowan

A VIGOROUS defence of large scale industrial units is made by Lord McGowan, chairman of Imperial Chemical Industries, Ltd., in an article in the current issue of *British Industries* dealing with "Industry's Need To-day."

"It has always been my belief that the large scale industrial unit is not only desirable but necessary," he states.

"It gives more security of employment, more competitive strength abroad, especially with foreign rivals. It makes for an elimination of the wasteful competition at home which leads to price-cutting and low wage rates, and it has made agreements easier both at home and abroad. In the case of my own company it has enabled us to do much more for labour than would have been possible by the individual units comprising our amalgamation. I have, therefore, always used my energies and influence towards bigger units in industry.

Lord McGowan.

"When these large units began in Great Britain there were many critics, but I think to-day most of these will have been silenced by the success which these corporations have registered. It is said that amalgamations of concerns engaged in the same industry prevent competition, which is supposed to make for efficiency; while that may be, to my mind it all depends on the system of organisation in operating an amalgamation.

"I do not forget, of course, that the smaller business has its place—and a valuable place—in industrial development, especially where craftsmanship and an individual sense of design play their part in the making of a finished product. But as to the future trend of industrial organisations, that is a question I leave with you, though I am personally sure that it lies with the big battalions. There is no putting back the clock, and there seems more need of the big unit now than ever before."

Lord McGowan also deals with the decline of British overseas trade and advocates as a solution the development of Britain's Colonial Empire and a bolder use of Export Credit Guarantees.

"Can this contraction of trade between nation and nation continue indefinitely?" he asks. "It springs largely from the wave of economic nationalism which started to flow soon after the Great War. Now short of some unimaginable change in the number of our population and the structure of our economic life, Great Britain has got to export or eventually suffer. At the same time it is all very well for spokesmen to adjure industrialists to do everything to sell their goods abroad. The trouble to-day is not so much to sell but to get paid. This question of payment has already been the stumbling block for some years, and it has affected I.C.I. to the extent that we have regrettably been forced to curtail business with some countries. Economic nationalism has also forced us to adopt a policy of local manufacture whenever the demand in a country has been sufficiently large to make the establishment of an enterprise economically sound. But we follow the practice of encouraging local people to take a financial interest in the companies we form abroad; in that we have been successful, and this policy removes the criticism of nationals in a country not being allowed to participate in its local development.

"The gloominess of the picture regarding foreign countries is, I am thankful to say, considerably relieved by the Empire. If the experience of I.C.I. is to be interpreted generally, it is to the countries of the British Empire that we must look for any overseas trade expansion in the near future. Here again the problem bristles with difficulties. The chief one to my mind is that of population: the Empire is still an empty house. The more inhabitants, the greater its total consumption, even though there may be some reduction in *per capita* consumption.

"Still, I am sure that the development of our colonial empire, as distinct from the Dominions, is one of the great tasks and needs of the future. If the standard of living, and therefore the purchasing power of the millions of inhabitants of our colonial empire could be raised, it would be the largest single step towards the solution of our export problem.

"Is there any practical short-term action we can take to stimulate exports? I think there is. I have already, earlier this year, suggested that a bolder use of export credit guarantees by the Government would be very helpful."

Lord McGowan continues:—

"When the opportunity offers I stress the necessity of research, and still more research. This country must become more research-minded if we are to keep our position with other industrial countries. Research on manufacturing processes produces greater efficiency and unlocks the door for creating articles, as yet unknown, which the world may require.

"I repeat the prediction of the course of world export trade in the future is difficult, but I am confident that no improvement will be possible by the unaided efforts of industrialists. There must be an anti-aggression front for commerce as well as for political security. That is to say, in these days of subsidised competition for shipping and other services, the Government have their part to play in the defence of our overseas trade. Our large scale industrial units will enable them the more easily to find co-operation."

American Chemical Industry

Trend Towards Geographical Concentration

CONCENTRATION of the United States chemical industry in areas possessing needed basic minerals is foreseen in a survey reported by R. N. Keller and T. T. Quirke, of Illinois University, to the American Chemical Society.

The report states that transportation of raw mineral resources is generally exceedingly expensive and the chemical industry might be expected to become geographically more and more concentrated within the districts of desirable geological resources. An increasing tendency to assemble in individual companies all stages of chemical production from the basic minerals to the marketable product was encouraging this geographical shift.

The report adds that the extreme complexity and interdependence within the chemical industry had given rise to a tendency to form large chemical companies which manufactured the chemicals from their basic ingredients, marketed the finished products, and utilised the by-products themselves. Scarcely any chemical plant or any one division of chemical industry was a complete entity in itself; all were interdependent to a greater or lesser degree. A product of one company might be a raw material of another company. This extreme complexity and interdependency probably had been the factors that had stimulated not so much a horizontal as a vertical type of development, in the large chemical corporations.

THE PHTHALOCYANINES*

A Class of Synthetic Pigments and Dyes

IN 1927 de Diesbach and von der Weid (*Helv. Chim. Acta, 10,* 886, 1927) described new insoluble blue compounds which they believed to be complex metal salts of aromatic *o*-dinitriles with copper and pyridine. By the action of cuprous cyanide, *o*-dibromobenzene, and pyridine, they obtained a blue insoluble compound to which they ascribed the formula $[C_6H_4(CN)_2 + C_5H_5N]_2Cu$. Undoubtedly this product was copper phthalocyanine. Their error in determining the nature of their products probably was due to the analytical difficulties characteristic of compounds of this series, coupled with the interest in metal complexes which had inspired their investigation. The following year Dandridge, Drescher, and Thomas (to Scottish Dyes, Ltd., British Patent 322,169, Nov. 18, 1929) filed a patent application describing new insoluble coloured organic compounds obtained by the action of ammonia on phthalic anhydride, phthalamide, or phthalimide in the presence of metals. They offered no theories as to the structure of these compounds, and did not recognise their identity with the products of de Diesbach and von der Weid. Nevertheless the first application of Dandridge, Drescher, and Thomas described the preparation of iron phthalocyanine, and this was followed quickly by a supplemental application describing copper and nickel phthalocyanines, certain substitution products, and a recognition of the utility of these products for "coloration purposes, for example, padding, printing, or pigmenting."

R. P. Linstead's Researches

The examination of the products of Dandridge, Drescher, and Thomas and the determination of their structure was referred to R. P. Linstead of the Imperial College of Science and Technology, London. The researches of Linstead and his students have resulted in a complete picture of the structure of this important new class of coloured compounds, the development of synthetic methods, the determination of their properties, and the systematic extension of the whole new field of useful pigments and dyes which they represent.

The fundamental reaction in all syntheses of phthalocyanine structures may be described as the interaction of a metal or derivative with an *o*-dicyano derivative of an aromatic compound or its equivalent. This reaction always leads first to the metal phthalocyanine, but demetallisation may be an accompanying reaction or may be effected subsequently. The fundamental reaction may be expressed by the following equation:—

4 aryl-$(CN)_2$ (or equivalent) + metal (or metal derivative) → metal phthalocyanine.

This reaction may be carried out under a wide variety of conditions. For example, the undiluted *o*-dinitrile may be mixed with the reacting metal or metal derivative and the mixture heated to a suitable reaction temperature, at which point a vigorously exothermic reaction takes place with the formation of the phthalocyanine; or it can be carried out in inert solvents, in which case the reaction rate and temperature conditions may be controlled more readily.

The fundamental reaction also may be extended to a wide variety of materials as equivalents of the *o*-dinitriles, conditions usually being such that intermediate formation of the nitriles may be postulated. For example, *o*-cyanobenzamides, *o*-halogenobenzonitriles, *o*-sulphobenzonitriles, *o*-dihalogenobenzenes, phthalimide plus ammonia or equivalents, and phthalic anhydride plus ammonia or equivalents all have been substituted successfully for phthalonitrile in the synthesis of phthalocyanines. Where active halogen or sulphonic acid compounds are used, a cyanide such as cuprous cyanide is supplied, and it is assumed that replacement of halogen or sulphono by cyanogen is the first step in the reaction.

The phthalocyanine pigments are all blues or greens; many of them are brilliant in shade whether judged as the crystalline colours or dispersed in various media. They are exceedingly insoluble in water and vary from totally insoluble to very slightly soluble in the usual organic solvents. The pigments are soluble in concentrated sulphuric and phosphoric acids, and in chlorosulphonic, anhydrous hydrofluoric, ethylsulphuric, and trichloroacetic acids; and in all instances they are reprecipitated by dilution with water. The products show amazing stability toward heat; many of them can be sublimed in a vacuum at temperatures of about 500° C.

Solubilised Phthalocyanines

The solubilised phthalocyanines, as typified by sulphonated copper phthalocyanine, show the expected solubility in water and alkalies. The colours are still brilliant blues to greens, the shades being shifted toward the green by sulphonation. The stability to light and other destructive influences of the soluble phthalocyanines is lower than that of the pigments, but the colours compare favourably with other acid colours of similar shade. On the other hand, conversion of the soluble phthalocyanines to insoluble metal salts and lakes improves their fastness properties, indicating that the unusual stability of the insoluble phthalocyanine pigments is in large part due to their very low solubility. The soluble phthalocyanines can be converted to salts of aromatic bases, yielding colours soluble in organic solvents.

The phthalocyanine pigments find application in virtually every field in which coloured pigments now are used. These uses will be discussed in detail in connection with the pigments now commercially available. The soluble phthalocyanines have been converted to a wide variety of insoluble salts and lakes; these products also find wide application in the pigment field. In addition, the soluble types are being used in various ways in textile and paper dyeing; upon conversion to salts or organic bases, they are utilised as alcohol-soluble blues and greens.

By far the greatest commercial interest to date in colours of the phthalocyanine series involves the copper derivative, a brilliant blue pigment of outstanding fastness properties. It was introduced first to the pigment trade in London in November, 1935, and American manufacture and trade introduction followed early in 1936.

Problems of Manufacture

As in every instance of a colour pigment, manufacture consists of two distinct problems: (a) The synthesis of the compound itself and (b) the conversion of the coloured compound to physical forms suitable for use in the many pigment outlets. This situation applies to an unusual degree to copper phthalocyanine, and new problems in synthesis and physical condition have been met and solved in the development of this product.

Copper phthalocyanine is insoluble in all ordinary solvents with the exception of concentrated sulphuric, phosphoric, chlorosulphonic, ethylsulphuric, and trichloroacetic acids. This insolubility persists even at high temperatures in organic solvents such as hydrocarbons, esters, alcohols, and ketones. The pigment has extreme stability to heat, is highly resistant to acids and alkalies, and is little affected by oxidising and reducing agents except under drastic conditions.

Of perhaps greatest interest to pigment users is the fact that copper phthalocyanine is exceedingly close to the ideal pure blue, since it absorbs almost completely the red and yellow portions of the spectrum, reflecting only blue and green bands.

The high tinctorial strength of the pigment, as judged in

* Extracts from an article by Miles A. Dahlen, of E. I. du Pont de Nemours and Co, Inc., in *Industrial and Engineering Chemistry*, Vol. 31, No. 7, 1939.

various media, deserves comment. When judged in light and medium shades, the colour is approximately twice as strong as the iron blues and twenty to forty times as strong tinctorially as ultramarine. When deep shades are evaluated, the inherent strength of a colour is not the major factor, and these values do not hold. In deep shades copper phthalocyanine suffers from the fact that it is still too strong to give the desired "bulk" in finishes; it also exhibits the troublesome bronziness characteristic of the older iron blues.

The properties of copper phthalocyanine made it inevitable that, if available at proper cost, it would find rapid adoption in the usual colour pigment applications, among which the following are particularly important:

Wide Use in Printing Inks

PRINTING INKS.—The pigment already is used widely in the printing ink field, having replaced in part the iron blues and various basic colour lakes. Inks containing this new pigment equal the most brilliant products previously available, and the fastness of the colours thus produced far surpasses that of the products replaced by this new pigment. The pigment also has solved a difficult problem—the provision of a suitable blue for three-colour printing. At first, considerable difficulty was encountered with the physical properties of the printing inks, but this has been overcome by special processing of the pigment as well as by suitable reformulation of the inks.

PAINTS, LACQUERS, AND ENAMELS.—Copper phthalocyanine is being adopted rapidly in the formulation of coloured finishes. Great difficulties have been experienced in the past with the poor fastness to alkalies of the established iron blues and the poor fastness to acids of the important ultramarines, especially when used in light shades; and the light fastness of both of the old types left much to be desired. Likewise serious difficulties have been encountered with changes in the shade and other properties of the old colour pigments upon storage of the coating compositions containing them. Copper phthalocyanine has overcome many of these difficulties.

PAPER.—The new pigment has found wide use in the production of brilliant blue coated papers and in beater dyeing of paper pulp; in each case the combination of brilliance of shade and fastness to all destructive agencies surpasses anything previously available. Of special interest is the rapid adoption of the pigment in the preparation of wallpapers, where exceptional light fastness and brilliance, even in light shades, is demanded. Actually, copper phthalocyanine provides the first blue pigment meeting the desired fastness standards. For use in paper colouring, the pigment has been provided in the form of a powder which disperses almost instantly in water to a colloidal solution.

Fast to Vulcanisation

RUBBER.—Copper phthalocyanine was adopted immediately in the rubber trade for the production of brilliant shades of blue, ranging from deep reddish blues to greenish pastel shades. The colour is fast to all conditions of vulcanisation, offers no difficulty due to migration, and, broadly speaking, meets all the requirements of rubber processing. It is of particular interest that, although the pigment contains copper and that even traces of ionisable copper catalyse the destruction of rubber, copper phthalocyanine is without effect. This is a striking proof of the "tight" nitrogen-to-copper bond in the molecule.

PLASTICS.—Its stability toward heat plus its unusual resistance to the other chemical and physical conditions encountered in the preparation of plastics make copper phthalocyanine particularly valuable in this field. Its utility has been demonstrated in phenol-formaldehyde, methacrylate, casein, acetate, and numerous other types of plastics.

TEXTILES.—Where pigment colours are used for textile printing, and where it is necessary to impart a temporary colour to certain yarns in the manufacture of woollens and worsteds, copper phthalocyanine has been found suitable.

Chlorinated copper phthalocyanine is almost totally insoluble in organic solvents, even at very high temperatures, and is soluble in concentrated sulphuric, phosphoric, and chlorosulphonic acids. The solubility in these acids is somewhat less than that of copper phthalocyanine itself. The pigment also has extreme heat stability, although purification by vacuum sublimation has not been disclosed. The colour is highly resistant to acids, alkalies, and oxidising and reducing agents except under drastic conditions not encountered in pigment use. The halogen atoms are tightly bound but can be replaced by other substitutes or by hydrogen under some experimental conditions.

Although this pigment has been available to the pigment trade for only a few months, its importance will be apparently of the same order as that of copper phthalocyanine. It is unnecessary to repeat the details of the various uses, since they are entirely comparable with those of the blue pigment.

This pigment is being provided in the several physical types corresponding with those of copper phthalocyanine. The pure pigment is available in a soft powder form that develops its full strength rapidly in the various nonaqueous media. It is available as an aqueous paste for conversion to extended types and also has been converted to a water-dispersible dry powder which yields a colloidal solution almost instantly. This type is particularly suitable for paper colouring.

Metal-free Phthalocyanine

Usually the simplest member of any series of dyes or pigments receives the first commercial attention. However, in the case of the phthalocyanines, phthalocyanine itself, more generally known as metal-free phthalocyanine, received attention only after the copper derivative had been developed. This was due in part to synthetic difficulties but more because of the circumstances attending the discovery of the copper compound.

The patent literature contains several disclosures of the preparation of metal-free phthalocyanine. These are of two types: (a) the preparation of the pigment directly from phthalonitrile under certain catalytic conditions, and (b) preparation of various metal phthalocyanines followed by removal of the metal. The commercial processes in use at present are of the latter type. As is described in the literature and patents, the metal may be removed readily from many of the metal phthalocyanies. This is true particularly of magnesium phthalocyanine, lead phthalocyanine, stannous phthalocyanine, and disodium phthalocyanine. Usually treatment with acids is the simplest procedure, although it is known that the alkali metal phthalocyanines also are converted to metal-free phthalocyanine by the action of methanol.

Metal-free phthalocyanine, it is apparent, will be an important product, although to a lesser degree than the blue and green already discussed. It will be used in printing inks where brilliant greenish blue shades are desirable; in paper colouring, especially for wrapping for food products where the presence of copper is objectionable; in the wallpaper trade where brilliant greenish blue shades are in demand; and perhaps in the rubber trade where there is an aversion to colours containing copper.

Soluble Dyes

The first interest in the phthalocyanine series was the use of these products as pigments. It was logical, however, that when this brilliant blue chromophore became available, every possible effort would be exerted to utilise the structure in soluble dyes for textiles and other dyeing purposes. Of the many soluble phthalocyanines prepared, the only type which has found commercial application to date is sulphonated copper phthalocyanine. In aqueous solution it is a brilliant greenish blue dye of moderate solubility.

The soluble salts of sulphonated copper phthalocyanine find some use in direct and mordant dyeing of cotton, in dyeing of animal fibres, and especially in mixtures as dyes for union textiles.

Litharge-Glycerine Cement

Conditions of Application

THE conditions under which litharge-glycerine cement may successfully be applied are described by Ziener (*Glass*, 1939, *16*, 276-278, 286; from *Sprechsaal*, 1939, 270). The essentials for satisfactory behaviour of the cement are that the litharge should be very fine, pure, fresh, and free from copper and iron, and that the glycerine should be dry and pure. The faces to be cemented must be well cleaned, and must then be roughened, either by etching, or preferably with sandpaper or blast. The pores should then be filled with the cement, by applying a little and rubbing it well in. Then the cement itself is spread on and the two faces pressed together and held in contact until set.

The relative proportions of litharge and glycerine are very important. A high ratio of solid to liquid (producing a doughy paste) gives a rapid setting cement (10-15 minutes), and one in which the difference between the coefficient of expansion of cement and glass is at a minimum: such a consistency is definitely to be recommended for glass-glass, etc., seals. A glycerine-rich cement sets slowly, and is much more liable to drop out or set up severe strains in the glass on setting. Rapid setting can be induced by heating the joint, but is liable to set up strains and is therefore to be avoided. The rate of setting depends very much on the atmospheric conditions; it is slowed up in cool, damp weather, and proceeds best in warm dry conditions. Moisture in the materials also retards the setting.

Seals made with this cement are resistant to weather, however tropical or damp. They are not attacked by acids, alkalies or ethereal oils, nor by chlorine or alcohol vapour, nor by most organic solvents. Their outstanding property is that of heat resistance up to 260°; up to this point the seals actually become harder. The cement is not completely water resistant, and if liable to be exposed to it should be covered with a layer of an artificial resin.

The cement is suitable for all kinds of glass-metal and stoneware-stoneware joints, and can be used for jointing glass to a number of substances, such as leather, wood, etc.

New Oil-from-Coal Process

Oxygen and Hydrogen Extraction at Low Cost

A NEW oil-from-coal process invented by Mr. D. Llewellyn Davies, of Clydach, South Wales, former mining adviser to Swansea Corporation, has this week reached the semi-commercial stage in production. It is estimated that the eventual cost of oil production may be somewhere in the region of five-pence per gallon. Mr. George Williams, chairman of the Industrial Development Council of Wales and Monmouthshire, speaking of the process, stated:—

"I have seen the oils which have been extracted from the various grades of coal, including anthracite. In addition to the production of oil and spirit, if the figures submitted by Mr. Davies are correct, oxygen can be extracted at a cost which is infinitesimal compared with the prices at present ruling in this country."

Sir William A. Jenkins, the Welsh industrialist, said: "The new process differs from low temperature carbonisation, which requires coals of a certain high volatile content and produces also a bye-product that competes with coal. In this new process coal is literally converted into oil, and any coal is suitable. The production of oil of any quality, heavy or light, will be merely a question of adjustment of temperature and pressure."

The process claims that no catalyst is required; that 70 per cent. of the weight of the coal reacted upon gives oil; the oil produced varies in C/H ratio from 8 to 10; and that the percentage of hydrogen content in coal reduces the cost of production. The inventor has the co-operation of Dr. William Thomas, and Mr. E. B. Bowen, of Porthcawl, both of whom are coal research experts.

Polymerisation of Sulphur Dioxide with Olefins*

Paracetic Acid an Effective Catalyst

THE polymerisation of sulphur dioxide with olefins has been the subject of intensive investigation but until recently no one had succeeded in causing polymerisation to occur between sulphur dioxide and vinyl chloride. Frey, Fitch and Snow (*U.S. Patent* 2,114,202, 1938) have reported this polymerisation but do not give any details. Marvel and Glavis (*J. Am. Chem. Soc.*, *60*, 2,622, 1938) have obtained vinyl chloride polysulphone by the use of old paraldehyde or paracetic acid as a catalyst. Analysis of this polymer shows that unlike other polysulphones, it contains two molecules of olefin per molecule of sulphur dioxide. The three possible structures for a polymer unit containing four carbon atoms between each sulphur atom are those in which the chlorine atoms are in the 1,3, as in II, 1,4 or 2,3 positions.

II $[-CH_2\text{-}CHCl\text{-}CH_2\text{-}CHCl\text{-}SO_2-]_X$

There are other possible structures with two carbon atoms between each sulphur atom but consideration of such structures indicated that they were less probable. The purpose of this investigation was to determine the structure of vinyl chloride polysulphone.

Paracetic acid was shown to be an effective catalyst for the polymerisation of sulphur dioxide and styrene, phenylacetylene, phenyl allyl ether, 1-pentene, and allyl chloride. The effective life was about two weeks. Vinyl chloride polysulphone was prepared in 10 per cent. yields using paracetic acid as a catalyst. When heated dry or in dioxane it lost sulphur dioxide and hydrogen chloride. No residue of definite composition was left. Concentrated nitric acid did not oxidise the polymer. Liquid ammonia or sodium in liquid ammonia removed sulphur and chlorine, leaving an insoluble polymeric residue. Activated zinc dust removed about one-half the chlorine from a sample suspended in boiling dioxane. Butadiene polysulphone was prepared and about 60 per cent. of the theoretical amount of chlorine added to it.

A comparison of this with vinyl chloride polysulphone on treatment with liquid ammonia showed some similarity. Attempts were made to plasticise the polymer. It could be heated to 165°, and fibred and X-ray photographs of the fibre showed orientation. Hydrolysis of the polymer with 20 per cent. alkali produced acetaldehyde in 10 per cent. yields and left a sulphur-containing residue. These results can be explained if the structure of the polymer were as shown in formula II. The hydrolysis reaction would indicate that the chlorine atoms are replaced by hydroxyl groups, the secondary carbon-sulphur linkage would split to form a β-hydroxyaldehyde, which would undergo a retrograde aldol condensation to produce acetaldehyde and the polymer of an aldehydo-sulphinic acid. None of the other structures can be used to account for these products of hydrolysis.

* Abstract of a thesis by L. H. Dunlap submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Chemistry at Illinois University.

BOYS HOSTELS ASSOCIATION

A very satisfactory Warden's report was unanimously adopted at the annual meeting of the Boys Hostels Association held in London last week. The Warden stated that over 300 boys had already passed through King George's House which was fast developing an atmosphere of friendship and activity encouraged by the splendid example of the John Benn Hostel.

In spite of the great increase in numbers, all the boys had been kept in good employment, in most cases with excellent prospects. During the past year the Tonbridge camp site was bought for £1,250, the Association being deeply indebted to Lord Leverhulme and the Thomas Wall Trust for substantial donations. The report emphasised the need for increased donations, more especially as the recent development of the work had coincided with a rise in the cost of living.

New Technical Books

THORPE'S DICTIONARY OF APPLIED CHEMISTRY. By J. F. Thorpe and M. A. Whiteley. Vol. III. 4th edition. London: Longmans, Green and Co. Pp. 608. 63s.

Volume III follows on the general lines laid down for Volumes I and II. It is notable for a long Monograph on cyanides which gives a full account of these important substances, and an article on crystallisation which presents the subject from a point of view rather different from that usually taken. Metallurgists will be interested in the Monograph on corrosion of metal and in its sequel on the prevention of corrosion; their attention should also be drawn to the articles on chromium and on copper. The articles on colloids and on deuterium present new fields in a clear and lucid manner. A comprehensive treatise on the cinchona alkaloids will, undoubtedly, commend itself to physiologists as well as to chemists generally. Mention should also be made of the Monographs on chlorine and on cyanine dyes, which will be found of special interest to photographers.

The Dictionary is not written entirely for experts, although it is expected that they will find in it much that will be useful to them. Its main object is to present to the general chemist and the expert alike a summary and account of the present day position of chemical science, and to enable them to find a description of all that may be included in that term.

A HIGHER SCHOOL CERTIFICATE INORGANIC CHEMISTRY. By E. J. Holmyard. London: J. M. Dent and Sons, Ltd. Pp. 529. 5s. 6d.

This book is intended for students who have already reached the standard of School Certificate chemistry, and work up to this level has therefore been omitted, or only briefly recapitulated. It is assumed that those who use the book will be simultaneously pursuing a course of appropriate practical work, and practical details have therefore not been included. On the other hand, the scheme and style of the book have been designed with certain important points in view. First, the allotment of space to individual topics is roughly in proportion to the frequency with which those topics appear in the examination papers. Second, those sections which deal with stock examination questions have been kept for the most part within such limits as may enable the candidate to reproduce them or their substance in half an hour. Third, the book is provided with more than the usual number of cross-references, and with instructions for making comparative tables, the object being to encourage the student in his assimilation of chemical facts. It may be well to add that the book contains sufficient general, theoretical, and physical chemistry, as well as descriptive chemistry, to form the main course of university scholarship candidates.

INORGANIC SYNTHESES. Vol. 1. Editor-in-Chief, H. S. Booth. New York: McGraw-Hill Book Co. Inc. London: McGraw-Hill Publishing Co., Ltd. Pp. 197. 18s.

This volume is the result of a meeting in 1933 of a group of inorganic chemists who decided that there was a vital need for a series of volumes giving detailed and tested methods for the synthesis of inorganic compounds, with similar objectives as "Organic Syntheses" which has been appearing annually since 1921.

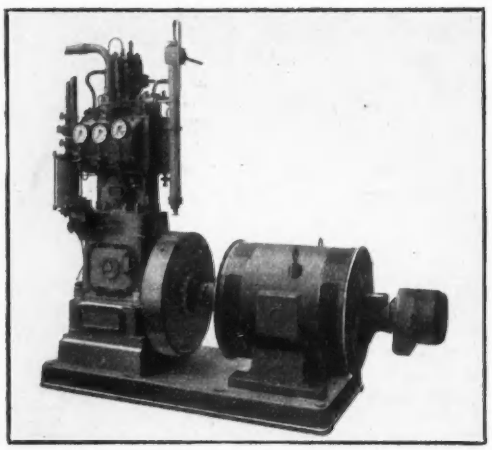
Each synthesis has been carefully checked in the laboratory, and usually in a laboratory other than that in which the synthesis was initiated. All directions and procedures have been critically edited by each member of the board of editors with the hope of minimising errors. Some of the methods are new, but many are improvements on older procedures. Where it was thought helpful, a critical survey of known methods introduces the synthesis and a summary of the more common properties of the substance concludes the synthesis to guide the user of the method. The objective is to provide sufficient detail for each preparation so that a chemist of ordinary experience may duplicate the results on first trial.

Recent Trade Literature

APEX CONSTRUCTION, LTD., have issued a leaflet entitled "Improved Pharmaceutical Equipment" on behalf of Stokes Machine Co., Philadelphia, for whom they are technical representatives in Great Britain. Details are given of improved tablet machines and of water stills for plant or laboratory. The latter are built in twenty-two stock models with capacities of from 1 to 100 gallons per hour. In addition larger single and multiple effect stills are specially built to meet specific conditions.

Volume 39 of *The Reflector* published by the BENJAMIN ELECTRIC, LTD., contains details of a new system of soft lighting which is now available under the name of Anolier. It is claimed that it provides an even illumination free from bright spots, glare or hard shadows. The units employed are made of aluminium with Ali-Tal anodised finish which both brightens and preserves the surface and possess an arrangement which illuminates the underneath surface of the reflector.

PETER BROTHERHOOD, LTD., Peterborough, have published an interesting booklet which contains a brief history of the company's progress since the time of its formation and short descriptions of the standard types of machinery which are now in production. Commencing with an illustration of a high speed generating set of nearly sixty years ago fourteen pages of the publication are devoted to photographs with descriptions of some typical examples of machinery and plant that are made at Peterborough. Among them are a two-crank,



two-stage compressor of 4,000 cubic feet capacity per minute, a five-stage, three-crank compressor for compressing hydrogen to 6,000 lb. per square inch, a three-stage oxygen compressor, a three-stage compressor designed for the purpose of recovering carbon-dioxide gas during the process of fermentation in the production of beer, wines and spirits (illustrated above), an Oliver filter for use in the manufacture of salt and a homogeniser.

HENRY WIGGIN AND CO., LTD., have issued a leaflet dealing with their recently-introduced twelve grades of Wilco-Wiggin Resistance "Thermometal" specially developed to satisfy the requirements of the electrical overload protective devices. They provide, it is claimed, a wider range of resistivity than has hitherto been available, the figures varying from as low as 5 microhms up to 93 microhms per cm^3. These materials have been carefully graded according to the requirements of various designs of thermal overloads, and the temperature-deflection constants are approximately the same throughout the range. High and uniform deflection is obtained with the minimum rise in temperature, thus facilitating calibration and rendering manufacturing tolerances less critical. The good mechanical strength of this series of bimetals enables the blade to operate the tripping mechanism without undue flexing, and without overstressing the element.

NEW TYPE OF LIGHT CONVEYOR

May Revolutionise Assembly of Small Parts

A NEW type of light conveyor of novel design has been marketed recently by the Shaw Mechanical Equipment Co., Liverpool.

It is claimed that it may revolutionise the assembly of small parts in various trades and is suitable for chemical manufacturers. The features advanced in its favour include the following :—

1. It is an endless conveyor, which is continuous in its accessibility.

2. The principle of the conveyor consists of a chain, driven by motive power, carrying trays in any direction required, with means for ejecting goods automatically at any desired point. The trays can be adapted either by using various colours, or by making the tray eject the component or components opposite to the operator concerned.

3. It will traverse corners.

4. No carrying surface is wasted running under benches.

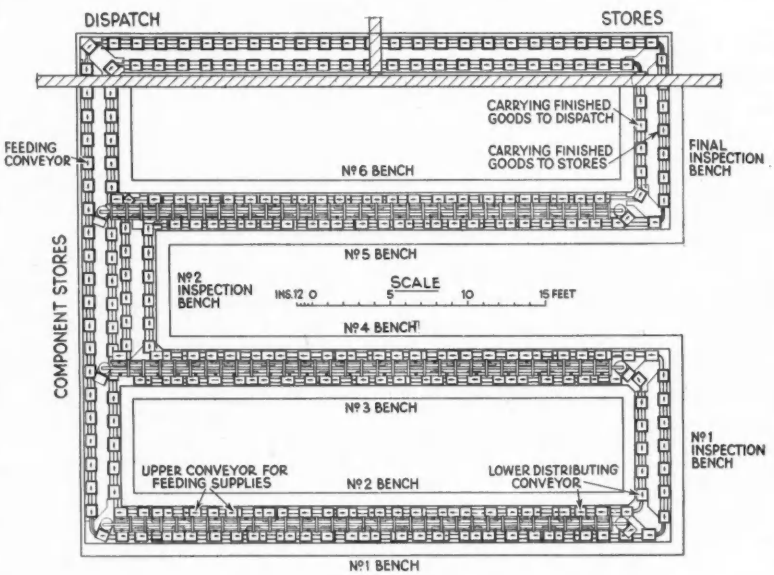
5. It is light and noiseless, and takes up little room as it runs on the bench on which assembly takes place.

6. It can deposit components automatically in front of any operator(s).

7. Finished goods can be carried, and automatically ejected from the trays at the stores or dispatch department.

8. It is an elementary principle that, in assembling, the operator must have the parts close to hand; in the same way when they are finished, they must be got out of the way either by sending them on to the next operator, or by disposing of it to "stores." The Shaw Patented Conveyor, it is claimed, efficiently does all these operations. It ensures continuous movement of the goods from the time they are put on the bench till they are shunted off complete.

9. Finally, this conveyor practically eliminates all handling and saves space. It is the elimination of handling which speeds up the work, and reduces manufacturing costs.



The conveyor displayed in the drawing shows the method adopted to feed light units to six different benches of operators. The final bench completes the assembly of the finished unit, and after inspection, carries it on the lower conveyor to either stores or dispatch departments. The feeding system is accomplished by endless chain conveyors on each twin bench running approximately 12 in. above the operators hands. Red trays and white trays carry assembly components to No. 1 bench and No. 2 bench respectively.

One feed attendant at the end of six benches keeps the trays fully supplied with parts as they rotate, so that the operator is never at any time without the component which comprises his or her work. The red trays and white trays are arranged alternately to assure a component being available at any moment. The length of the benches and the number of operators determines whether one or more "feeder" attendants are necessary for six benches.

Beneath the feeder conveyor the system shows two slat conveyors at bench level, travelling in unison (one for each bench) and continuing at right angles along No. 1 Inspection bench, until at benches 3 and 4 it travels in the opposite direction to No. 1 and 2. It turns at right angles again for Inspection bench No. 2, returns along 5 and 6 in the same direction in which it started. Final Inspection bench No. 3 is arranged at the end of No. 5 and 6.

The finished product is then put on the continuing conveyor units according to their destination, one leading to "stores" and the other to "dispatch." Being endless the conveyor returns to the starting point at bench No. 1.

Except at the feeding end of the conveyor, the components are never moved, except for assembly purposes. They are continuously carried to the final destination on the one system, without intermediate handling or labour. The chain drive is carried out with 1 in. pitch industrial conveyor chain. The motor is a three-phase unit of 1 to 3 h.p. according to the load, and the trays are mounted on ball bearing rollers, which run in a special track lined with special oil-and-heat-proof tough rubber of almost indestructible quality.

All moving parts are fitted with ball bearings wherever possible, and toughened steel pins are used wherever wear is likely. Speed can be adjusted to any requirement, and is noiseless in operation.

The two conveyors can be separated. It may not in all cases be necessary to have the lower conveyor, or again it may not be necessary to have the top conveyor. This patented conveyor can be adapted to suit many varied conditions. In given circumstances, it could, for example, have, say, six benches of operators, and final distribution from assemblies to both Stores and Dispatch. On the other hand, it may be more suitable to have an upper conveyor fitted with hooks for carrying certain components, instead of trays.

Letters to the Editor

Canadian Interest in Low-Grade Ores Process

SIR,—I have read with interest and appreciation your editorial in your July 22 issue.

I have noted, with particular interest, your reference to a process being installed by British metallurgists in Germany for the utilisation of low grade iron ore.

I am drawing this to the attention of the National Research Council in Canada, in case they are not familiar with this development. I agree with you, this process may have considerable bearing on this particular subject.

From reactions I have noted so far, and from letters received, I believe my effort on behalf of Canada has been well received and has been of considerable advertisement value to my country.—Yours very truly,

Shawinigan, Ltd., V. G. BARTRAM.
Lloyd's Avenue, E.C.3.
July 31, 1939.

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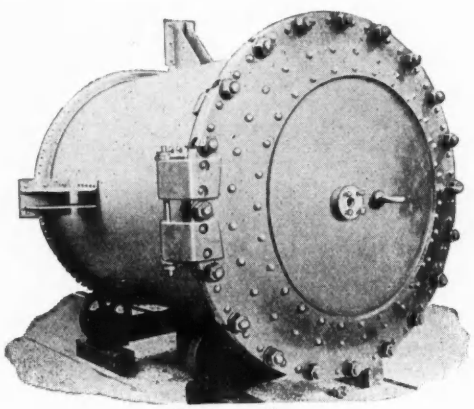
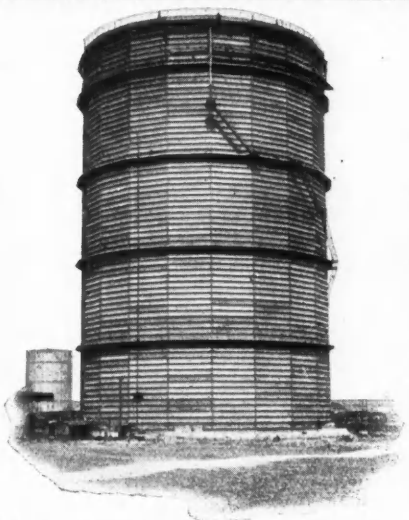
CLAYTON, SON & Co LTD LEEDS

Riveted Steel Tanks for the Storage of Liquid Propane and Butane
31'·6" × 7'·0"
TEST PRESSURE : 568 lbs. per sq. in.

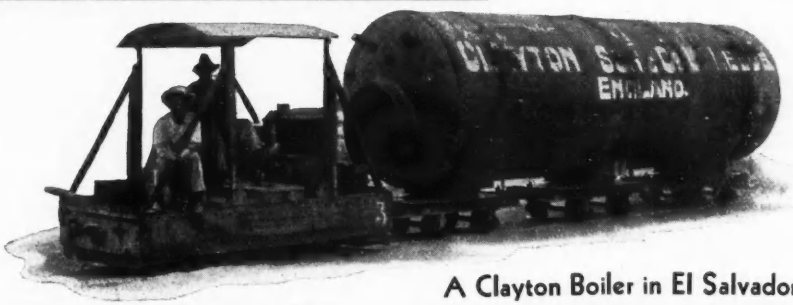
70 YEARS EXPERIENCE



Boiling Kier.



Waterless Gasholders, Man. Type
2 Millions & 1 Million Capacity.



A Clayton Boiler in El Salvador.

CHEMICAL PLANT, PLATE WORK of EVERY DESCRIPTION
TANKS, OIL REFINING PLANT, STEAM BOILERS
GASHOLDERS, STILLS, WELDING SPECIALISTS

LONDON OFFICE, ABBEY HOUSE, 2, VICTORIA ST., S.W.1

PERSONAL NOTES

MR. ROGER K. ALLEN, who represents the fourth generation of his family in the business, and MR. R. PETER MERRITT have been appointed directors of Stafford Allen and Sons, Ltd.

* * * *

THE Council of the City and Guilds of London Institute have conferred the distinction of Fellow of the Institute upon PROFESSOR L. F. GOODWIN and SIR GILBERT T. MORGAN, O.B.E., F.R.S.

* * * *

MR. W. WOODHOUSE, chief chemist to the Stanton Ironworks Co., Ltd., was the speaker at the Sutton-in-Ashfield Rotary Club on July 25, his subject being "Pig-iron and Concrete Pipes."

* * * *

DR. H. J. HIBBEN, a member of the research staff of the geophysical laboratory of the Carnegie Institution of Washington, has been appointed chief of the chemical division of the U.S. Tariff Commission.

* * * *

SIR ANDREW RAE DUNCAN is joining the board of Imperial Chemical Industries, Ltd. Sir Andrew is chairman of the

Sir Andrew Rae Duncan.

executive committee of the British Iron and Steel Federation, and a director of the Bank of England. He is also a member of the Central Electricity Board.

MR. JOHN ALEXANDER COCKBURN, former factory manager of Nobels Explosive Company, Ardeer, Stevenston, Ayrshire, has left personal estate valued at £33,799.

OBITUARY

ALDERMAN W. G. HUTCHINSON, of Hutchinson and Co., manufacturing chemists, Burton-on-Trent, died recently, aged 83.

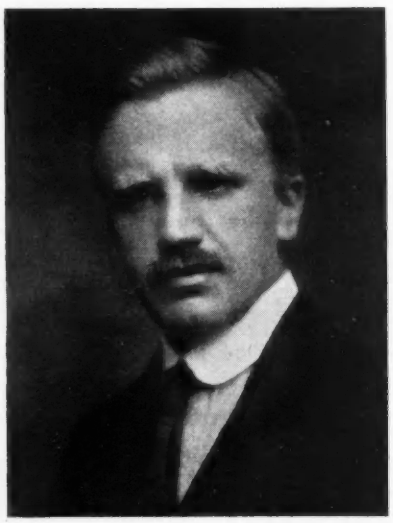
* * * *

MR. HUGH WAGSTAFF, joint managing director of Reads, Ltd., keg, drum, etc., manufacturers of Liverpool, died last week after a very short illness..

* * * *

MR. WILLIAM HAMILTON FERGUSON, senior partner of Ferguson and Menzies, oil refiners, Lawmoor Street, Glasgow, died on July 31 at the age of 76. Mr. Ferguson entered the oil refining industry over 60 years ago, and after a long period as works manager was associated with the late Mr. Robert Menzies in founding the firm of Ferguson and Menzies.

MR. REGINALD CRAVEN, lecturer in chemistry at Robert Gordon's Technical College, Aberdeen, for the past fifteen years, died on July 28 at the age of 43. A native of Halifax, he was educated at Halifax Technical College and at the



The late Mr. Reginald Craven.

Royal College of Science, London, gaining his B.Sc. degree and becoming an Associate of the College. During the war he was responsible for research work in a London factory in connection with the preparation of gases and was badly gassed in an accident. Mr. Craven was secretary of the North of Scotland branches of the Institute of Chemistry and the Chemical Society.

An Efficient Defoaming Agent

Mixture Based on Octyl Alcohol

P. A. RACICOT and C. S. Ferguson described the development of an efficient defoaming agent in a paper presented before the Division of Agricultural and Food Chemistry at the 97th meeting of the American Chemical Society and reported in *Industrial and Engineering Chemistry, Anal. Ed.*, 1939, *11*, 380. In certain food and biological chemical analyses foaming causes difficulties, especially when viscous substances in water are used at room temperatures. In some of such analytical procedures paraffin oil is a good defoaming agent. Capryl alcohol was tried and, although better than paraffin oil, it had the disadvantage of causing a precipitate with Nessler's reagent. Phenyl ether was not as good as capryl alcohol in the prevention of foam and had the same disadvantage in nesslerisation. Octyl alcohol (2-ethylhexanol) was tried and found to be a good defoaming agent, having no effect on Nessler's reagent, but was unsatisfactory for a 2-hour run because it volatilised too rapidly.

Experiments with octyl alcohol, mixed with various substances which would reduce its vapour tension and possibly increase its defoaming property, resulted successfully with the following mixture:

Hard paraffin	1 part
Heavy paraffin oil (U.S.P. liquid petrolatum)	1 part
Octyl alcohol	2 parts (by volume)

Heat the paraffin and paraffin oil until the paraffin is melted. At this point, stop heating and add the octyl alcohol, mix well, and pour into glass jars or wide-mouthed bottles and allow to cool. For use in aerometric determinations of free ammonia, 1 gram (this is not critical) in each cylinder works very well.

General News——From Week to Week

THE CHEMICAL SUPPLY CO., LTD., Barking, will be closed for the summer holiday from Friday, August 4 to Monday, August 14.

GRANGEMOUTH Dean of Guild Court has passed plans for the erection by Scottish Oils, Ltd., of buildings to cost £32,850, including a boiler-house extension and chimney, to cost £15,000.

EMPLOYEES of Oliver Wilkins, Ltd., paint manufacturers, of Derby, are to receive increases in wages with 32,000 other workers employed by Imperial Chemical Industries, in whose group of companies the firm is included.

THE THIRD EDITION of "Fertilisers in Modern Agriculture" by Sir E. J. Russell, F.R.S., director of the Rothamsted Experimental Station, Harpenden, has been published by the Ministry of Agriculture and Fisheries (Stationery Office, 4s.).

A TEAK MEMORIAL SEAT to the late Sir William Perkin, founder of the coal tar dye industry, is to be unveiled and dedicated to the public at Sudbury, Middlesex, on August 12. The seat will be outside a recreation ground, and opposite the site where Sir William's house and laboratory stood. Money for the memorial has been obtained by public subscription.

A COMMITTEE which includes many members of Parliament has been set up to encourage Czech industrialists to establish new industries in this country. It is understood that only a restricted number of industries would be likely to succeed here, and to determine what these are the various interests likely to be concerned are to be consulted. The principal industries to be considered include glass and porcelain.

THE ADVISORY COMMITTEE for Advanced Chemistry of the Yorkshire Council for Further Education has planned a series of courses at various centres for the purpose of enabling senior students, young graduates and experienced chemists to keep abreast of the latest developments in the theory and technique of special branches of their work. Commencing October 9 a series of lectures will be given at Bradford Technical College on "The Microscopy of Food and Drugs" and a further series will commence on October 11 on "Bio-Chemical Analysis." At Huddersfield Technical College a series of lectures on "Chemical Engineering" will commence on September 21 and the same subject will be dealt with in lectures at Leeds College of Technology commencing September 29.

FOR MANY YEARS past Leeds University has provided courses for post-graduate students leading to special diplomas both in gas engineering and in fuel and metallurgy. It has now added to these a one-year course leading to a post-graduate diploma in fuel and refractory materials, in order to meet the growing demand for men with a special training in refractory materials. Commencing in October next, the new course will be given in the Department of Coal Gas and Fuel Industries, and will be additional to the normal instruction in the subject received by all students reading for degrees in gas engineering and in fuel and metallurgy. An approved degree in science or technology is required as a preliminary qualification; and the subsequent specialised training in fuel and refractory materials is intended as preparation for entry into either the "manufacture" or "user" sides of the refractories or allied industries.

ACCORDING to the Business Forecast of the Federation of British Industries, politics is still the over-riding factor in the world economic situation. In every important country, except America, rearmament is now the mainstay of economic activity; and under its influence the volume of business activity should continue to expand for some months to come. This activity, by increasing the general purchasing power, is helping to bring revival in many industries not directly affected by the defence programme, notably the general consumption industries. Nevertheless, the present boom is still very lopsided; while some industries are enjoying a high level of prosperity others are becoming more depressed. Another problem which is causing difficulties is the absence of available reserves of skilled labour in certain armament industries, and the fear lest this situation at a time of accelerated armament expenditure may set in train an upward spiral of inflation in both wages and the prices of finished goods. This is specially important from the point of view of our export trade and balance of international payments. Should the increase in the defence programme lead to a further expansion of our imports then, it will not be easy to prevent our balance of trade from becoming still more unfavourable.

THE OXLEY ENGINEERING CO., LTD., held their fourth annual sports day at Pateley Bridge on July 22. Over one hundred were present including Mr. H. H. Hollis, chairman and managing director, and Mr. H. Saville, director.

A NUMBER OF YOUNG MEN who were formerly employed in the I.C.I. works at Mossend, Lanarkshire, are to receive three months' training as analytical assistants in the I.C.I. laboratories at Billingham. The young men became unemployed when the works closed down a few weeks ago, and in Lanarkshire, where suitable openings are restricted, this gesture by I.C.I. is much appreciated.

Foreign News

A JEWISH farmer in the Tel Aviv district has successfully grown the first soya beans in Palestine.

OWING to the Government inspired programme for agricultural self-sufficiency Italy's consumption of chemical fertilisers is increasing.

A LARGE aluminium plant is being constructed by the Soviet Government near Kandalaksha in the Arctic circle. Production will start next year.

THE HAKODATE FISHERY SCHOOL at Hokkaido (Japan) is reported to have developed a process for extracting gelatine from shark bones and from cod skin.

THE CARBO-CHIMIQUE COMPANY OF BRUSSELS is planning the erection of a dyestuffs factory in which sulphur black will be one of the first products on the range.

THE UNITED STATES domestic output of benzol for the first five months of 1939 increased to 35,261,000 gallons from 28,018,000 during the corresponding period of 1938.

ACCORDING to official statistics, Japan's output of iodine increased from 37,570 kilogs in 1936 to 47,659 kilogs in 1937. The production of potassium iodide in the same period expanded from 32,554 to 50,130 kilogs.

RUMANIAN manufacturers of naphthionic acids are hoping to develop their trade with the U.S.A. and are planning an increase in output accordingly. They expect to export monthly to the U.S.A. some 12,000 kilogs of naphthionic acids.

OIL SHALE DEPOSITS have been located in various parts of Southern Belgium, but it is not yet certain whether they can be exploited economically. In the meantime the shale oil deposits of the Belgian Congo are receiving closer attention by Belgian industrialists at the suggestion of the Colonial Ministry.

BY A RECENT DECREE of the Esthonian government, all manufacturers, importers, wholesale and retail traders will be required to hold reserve stocks of numerous raw and manufactured materials. These include aluminium, glycerol, rubber, sulphur, chloride of lime, tanning extracts, active carbon, certain dyes and pharmaceutical products. Duty on such stocks will not be levied until actually used.

THE CHINESE MINISTRY OF FINANCE has prohibited the import into China of cosmetics. The ruling is explained as a war time economy measure, designed to stabilise the external value of Chinese currency, to encourage frugality, stimulate domestic production of substitutes, and to prevent goods of doubtful origin or imitations from entering China in the present national emergency.

THE JAPANESE DEPARTMENT OF COMMERCE AND INDUSTRY, which has decided to enforce compulsory control over the production, distribution, and consumption of chemical products that have hitherto been under voluntary control, is now drawing up regulations for the control of hydrochloric acid and calcium chloride. Both of these are important in the munitions industry and, as their prices have nearly doubled in recent months as a result of unbalanced demand and supply, the Department intends to fix official quotations for them in order to check the rising prices, and will at the same time control distribution. It is feared, however, that price restrictions may cause a drop in production as there is some shortage in the supply of salt from which hydrochloric acid is derived. The Government will therefore issue an order for increased production in order to ensure an adequate supply. Systematised single-unit control over the production, distribution, and prices of hydrochloric acid and bleaching powder will be effected by the authorities.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Applications for Patents

PRODUCTION OF A GEL COMPOUND from plants, etc.—African Sisal and Produce Co., Ltd., Sir J. F. Ramsden, C. L. Walsh, and C. S. Townsend. 21717.

TREATMENT OF GEL EXUDATIONS from plants.—African Sisal and Produce Co., Ltd., Sir J. F. Ramsden, C. L. Walsh, and C. S. Townsend. 21718.

PRODUCTION OF A MAGNETIC PRODUCT from oxidic iron ores.—A. Aide, Ltd., and H. E. Coley. 21214.

ALLOY STEEL.—Akomfina, A.-G. für Kommerzielle und Finanzielle Angelegenheiten. (Switzerland, July 25, '38.) 21572, 21574.

PRODUCTION OF ARTIFICIAL BODIES FROM PROTEIN.—A.-G. für Vermogensverwertung. (Germany, July 23, '38.) 21370; (Germany, Aug. 2, '38.) 21371.

LIQUID COMPOSITIONS for electrical insulation.—M. H. M. Arnold, and Imperial Chemical Industries, Ltd. 21755.

METAL ALLOYS, ETC.—B. S. Bernstein. 21184.

RECOVERY OF NITROGEN from the atmosphere.—Birmingham Aluminium Casting (1903), Co., Ltd., and G. O. Taylor. 21381.

MANUFACTURE OF FLOATING SOAP.—P. F. Boehm. 21073.

CELLULOSE DERIVATIVES.—British Celanese, Ltd. (United States, July 26, '38.) 21704; (United States, Aug. 24, '38.) 21705.

MANUFACTURE OF ALDEHYDES from alcohols.—British Industrial Solvents, Ltd., R. W. Reynolds-Davies, and E. E. Connolly. 21590.

PREPARATION, ETC., OF ALUMINIUM, ETC.—British Non-Ferrous Metals Research Association, and W. A. Baker. 21194.

PREPARATION, ETC., OF NON-FERROUS METALS.—British Non-Ferrous Metals Research Association, and W. A. Baker. 21195.

PREPARATION OF UREA-FORMALDEHYDE POLYMERS for papermaking. Brown Co. (United States, Aug. 23, '38.) 21595.

MANUFACTURE OF ACID WOOL DYESTUFFS.—A. Carpmael (I. G. Farbenindustrie.) 21068.

PROCESSES OF REACTING ORGANIC COMPOUNDS with the aid of a halide catalyst.—Colgate-Palmolive-Peet Co. (United States, July 26, '38.) 21564.

MANUFACTURE OF UREA CHLORIDES and isocyanic acid esters.—Deutsche Hydrierwerke, A.-G. (Germany, July 27, '38.) 21373.

CONTINUOUS CASTING OF COPPER and copper alloys.—G. W. Dimmick (American Smelting and Refining Co.). 21638.

COATED MAGNESIUM, ETC., ARTICLES.—Dow Chemical Co. (United States, Aug. 12, '38.) 21732.

PRODUCTION OF COLOURED COATINGS upon magnesium, etc.—Dow Chemical Co. (United States, Aug. 12, '38.) 21733.

SYNTHETIC RESINS.—E. I. du Pont de Nemours and Co. (United States, July 22, '38.) 21491.

MANUFACTURE OF OXIDE OF IRON OXIDE from green coperras.—A. J. Evans. 21391.

PRODUCTION OF IRON-SILICON ALLOYS having a steep ascent of the induction curve dependent upon the field strength.—Fides Ges. für die Verwaltung und Verwertung von Gewerblichen Schutzrechten. (Germany, July 20, '38.) 21137.

TREATMENT OF IRON-SILICON ALLOYS.—Fides Ges. für die Verwaltung und Verwertung von Gewerblichen Schutzrechten. (Germany, July 20, '38.) 21138.

METHOD FOR REFINING MOLTEN METALS.—A. Fleischmann. 21247.

PRODUCTION OF NITRO COMPOUNDS.—R. G. Franklin, F. J. Wilkins, and Imperial Chemical Industries, Ltd. 21570.

REFRACTORY CEMENT COMPOSITION.—E. E. Gaunt, and Stillite Products, Ltd. 21351.

MANUFACTURE OF COMBINED RUBBER and mineral fibre compositions.—E. E. Gaunt, and Stillite Products, Ltd. 21352.

RETORTS FOR THE CARBONISATION OF COAL.—Gibbons Bros., Ltd., and R. M. Farror. 21767.

MAGNESIUM ALLOYS.—Giesche's Erben, G. von. (Germany, Dec. 16, '38.) 21181, 21182, 21686.

MAGNESIUM ALLOYS.—Giesche's Erben, G. von. (Germany, Dec. 17, '38.) 21183.

ZINC ALLOYS, ETC.—Giesche's Erben, G. von. (Germany, Jan. 20.) 21687.

TREATMENT OF FABRICS.—J. S. Gourlay, and Imperial Chemical Industries, Ltd. 21269.

DETERGENTS, ETC.—E. V. Hayes-Gratze. 21695.

TREATMENT OF HEAVY PETROLEUM OILS, ETC.—E. Hene, and Trinidad Leaseholds, Ltd. 21656.

METHOD FOR RECOVERING SOLVENTS.—H. Horio. 21642.

MANUFACTURE OF SHAPED ARTICLES OF RUBBER, ETC.—I. G. Farbenindustrie. (Germany, July 22, '38.) 21080.

MANUFACTURE OF WATER-INSOLUBLE AZO-DYESTUFFS.—I. G. Farbenindustrie. (Germany, Aug. 6, '38.) 21287.

MANUFACTURE OF AROMATIC SULPHONES.—I. G. Farbenindustrie. (Germany, July 23, '38.) 21369.

MANUFACTURE, ETC., OF WATER-SOLUBLE BASIC DYESTUFFS.—I. G. Farbenindustrie. (Germany, July 29, '38.) 21459; (Germany, May 5.) 21460.

MANUFACTURE OF WATER-SOLUBLE CONDENSATION PRODUCTS.—I. G. Farbenindustrie. (Germany, July 25, '38.) 21482.

ELECTRO-DEPOSITION OF CHROMIUM.—I. G. Farbenindustrie. (Germany, Aug 4, '38.) 21626.

MANUFACTURE OF CHLORINATED BROMO-METHANES.—I. G. Farbenindustrie. (Germany, July 28, '38.) 21706.

MANUFACTURE OF WASHING, ETC., AGENTS.—I. G. Farbenindustrie. (United States, July 27, '38.) 21758.

HEAT RESISTANT ORGANIC COMPOSITIONS, ETC.—Interchemical Corporation. (United States, Aug. 5, '38.) 21465; (United States, April 12.) 21466; (United States, July 11.) 21467.

ALKYD RESINS, ETC.—Interchemical Corporation. (United States, April 12.) 21470; (United States, July 11.) 21471.

MANUFACTURE OF BUTADIENE.—Istituto per lo Studio della Gomma Sintetica, and G. Natta. (Italy, Aug. 13, '38.) 21752.

PROCESS FOR MANUFACTURING VEGETABLE PROTEINS.—H. Iwamae. (Japan, July 26, '38.) 21190, 21191.

MANUFACTURE OF PROTEIN FIBRES.—H. Iwamae. (Japan, July 26, '38.) 21192.

MANUFACTURE OF LIQUID HYDROCARBONS.—G. W. Johnson (I. G. Farbenindustrie.) (July 15, '38.) 21463.

CATALYTIC CRACKING OF HYDROCARBONS.—G. W. Johnson (I. G. Farbenindustrie.) 21578.

RESIN LAYERS.—Kodak, Ltd. (United States, July 27, '38. 21764.

GRANULATION OF METALS.—Lockwood and Co. (Plasco), Ltd., and C. M. Openshaw. 21514.

REFINING OF PIG-IRON, ETC.—Low Moor Alloy Steel Works, Ltd., and A. C. Nesfield. 21576.

METHODS OF APPLYING OVERLAYS to ferrous metal bases, etc.—Mond Nickel Co., Ltd. (United States, July 27, '38.) 21124.

REDUCTION OF THE WAX CONTENT of mineral oils containing wax. A. W. Nash, and T. G. Hunter. 21310.

TREATMENT OF FABRICS.—H. A. D. Perry, and Imperial Chemical Industries, Ltd. 21268.

RENDERING IRON AND STEEL of improved resistance to corrosion. Pyrene Co., Ltd. (United States, July 25, '38.) 21643.

ARTIFICIAL FERTILISERS, ETC.—J. Ray. 21093.

PROCESS FOR THE GRANULATION OF SUPERPHOSPHATE.—Silesia Verein Chemischer Fabriken. (Germany, Aug. 15, '38.) 21759.

MANUFACTURE OF SUBSTITUTED HETEROCYCLIC DERIVATIVES.—Soc. des Usines Chimique Rhone-Poulenc, and P. Viaud. 21627.

MANUFACTURE OF ESTERS.—Soc. of Chemical Industry in Basle. (Switzerland, July 21, '38.) 21077; (Switzerland, Dec. 27, '38.) 21078; (Switzerland, June 1.) 21079.

MANUFACTURE OF AZO-DYESTUFFS.—Soc. of Chemical Industry in Basle. (Switzerland, July 22, '38.) 21081; (Switzerland, July 1.) 21082.

PROCESS FOR HYDRATING ACETYLENE DERIVATIVES of the cyclopentanopolyhydrophenanthrene series.—Soc. of Chemical Industry in Basle. (Switzerland, July 23, '38.) 21083; (Switzerland, Nov. 19, '38.) 21084; (Switzerland, April 27.) 21085.

PRODUCTION OF FAST TINTS ON CELLULOSE FIBRE.—Soc. of Chemical Industry in Basle. (Switzerland, July 25, '38.) 21203; Switzerland, June 26.) 21204.

MANUFACTURE OF DERIVATIVES OF OXY-AZO-COMPOUNDS.—Soc. of Chemical Industry in Basle. (Switzerland, July 27, '38.) 21435.

MINERAL OIL COMPOSITIONS.—Socony-Vacuum Oil Co., Inc. (United States, Aug. 3, '38.) 21647.

BLENDING AGENTS for lubricating oils.—Standard Oil Development Co. (United States, Nov. 19, '38.) 21212.

COPPER BASE ALLOYS.—A. H. Stevens (Brush Beryllium Co.). 21337.

METHOD OF TREATING POLYMERIC VINYLIDENE CHLORIDE.—W. J. Tennant (Dow Chemical Co.). 21734.

APPARATUS FOR POLYMERISATION OF GASEOUS OLEFINE, ETC.—Universal Oil Products Co. (Dec. 10, '37.) (United States, Aug. 23, '37.) 21649.

HYDROLYSIS OF STARCH-CONTAINING MATERIALS.—Usines de Melle. (France, July 30, '38.) 21585; (France, Aug. 30, '38.) 21586.

PROCESS FOR OBTAINING IRON from the slags arising in the soda desulphurisation of pig iron.—Vereinigte Hüttenwerke Burbach Eich-Düdelingen, A.-G., and A. Wagener. 21635.

COATING COMPOSITIONS, ETC.—W. A. Waldie. (United States, May 3.) 21499, 21500, 21501.

MANUFACTURE OF THERAPEUTICALLY VALUABLE SULPHO-COMPOUNDS. Wellcome Foundation, Ltd., T. A. Henry, and W. H. Gray. 21728.

Complete Specifications Open to Public Inspection

PROCESS FOR MAKING CHROMIUM-IRON, or steel alloys and compositions for use in said process.—M. J. Udy. Jan. 22, 1938. 7281/38.

ALLOYING MOLYBDENUM with ferrous metals.—Climax Molybdenum Co. Jan. 18, 1938. 11563/38.

COMPOUND FOR DETERGENT and other purposes.—Colgate-Palmolive-Peet Co. Jan. 18, 1938. 11784/38.

RECOVERY OF PRECIOUS METALS lost during catalytic conversion of gases.—Hercules Powder Co. Jan. 19, 1938. 27525/38.

MANUFACTURE OF COATING-COMPOSITIONS.—Standard Oil Development Co. Jan. 18, 1938. 27827/38.

METHOD OF IMPROVING THE ELASTIC PROPERTIES of structural low-alloy steel.—Kohle-und Eisenforschung Ges. Jan. 24, 1938. 31737/38.

STEEL ALLOYS.—Kohle-und Eisenforschung Ges. Jan. 19, 1938. 32289/38.

DESULPHURISATION OF PIG IRON.—K. M. Tigeschiold. Jan. 24, 1938. 531/39.

AMALGAMATION OF METALS.—Allgemeine Treuhand, A.-G. Jan. 19, 1938. 1157/39.

MANUFACTURE OF WATER-INSOLUBLE AZODYESTUFFS.—I. G. Farbenindustrie. Jan. 21, 1938. 1282/39.

PRODUCTION OF AZO-DYESTUFF on the fibre.—Chemical Works, formerly Sandoz. Jan. 18, 1938. 1625/39.

MANUFACTURE OF UREA DERIVATIVES.—Soc. of Chemical Industry in Basle. Jan. 18, 1938. 1750/39.

MANUFACTURE OF SULPHONAMIDE-ALDEHYDE CONDENSATION PRODUCTS.—Fahlberg-List, A.-G., Chemische Fabriken. Jan. 18, 1938. 1752/39.

MANUFACTURE OF COLOURED SHAPED ARTICLES from polymerisation artificial resins.—Rohm and Haas Ges. Jan. 19, 1938. 1779/39.

MANUFACTURE OF CEMENT and alkali metal aluminate.—I. G. Farbenindustrie. Jan. 20, 1938. 1950/39.

PRODUCTION OF HYDROXY CARBOXYLIC ESTERS.—Consortium Fur Elektrochemische Industrie Ges. Jan. 21, 1938. 2123/39.

MANUFACTURE AND APPLICATION OF CONDENSATION PRODUCTS.—Soc. of Chemical Industry in Basle. Jan. 22, 1938. 2127/39.

MANUFACTURE OF CONDENSATION PRODUCTS.—Soc. of Chemical Industry in Basle. Jan. 22, 1938. 2131/39.

RECOVERY OF SULPHUR DIOXIDE.—R. F. Bacon. Jan. 21, 1938. 2144/39.

RECOVERY OF SULPHUR DIOXIDE.—R. F. Bacon. Jan. 21, 1938. 2145/39.

PREPARATION OF USCHARIN AND USCHARIDIN.—E. Boehringer, A. Boehringer, J. Liebrecht, and I. L. Boehringer. Jan. 22, 1938. 2323/39.

MANUFACTURE OF POLYMERISATION PRODUCTS.—I. G. Farbenindustrie. Jan. 24, 1938. 2505/39.

MANUFACTURE OF DRIERS.—I. G. Farbenindustrie. April 1, 1937. 20832/39.

Specifications Accepted with Date of Application

PROTEIN PREPARATIONS.—C. Weizmann. Oct. 15, 1937. 509,495.

ARTIFICIAL PRODUCTION OF FATS.—K. Brandt. Oct. 17, 1936. 509,755.

INSECTICIDE.—W. C. O'Kane. Nov. 16, 1937. 509,819.

PLASTICISED POLYVINYL ACETAL RESINS.—L. Mellersh-Jackson (Fiberloid Corporation). Nov. 17, 1937. 509,696.

PLASTICISED POLYVINYL ACETAL RESINS.—L. Mellersh-Jackson (Fiberloid Corporation). Nov. 17, 1937. 509,596.

WATERPROOFING AGENT and method of manufacturing and applying the same.—Granitese (Great Britain), Ltd., G. J. Staples, and J. C. B. McGuffie. Nov. 18, 1937. 509,759.

MANUFACTURE AND PRODUCTION OF RESINOUS OR RUBBER-LIKE SUBSTANCES.—G. W. Johnson (I. G. Farbenindustrie.) Dec. 21, 1937. (Sample furnished.) 509,823.

MANUFACTURE OF UNSATURATED ACIDS.—Distillers Co., Ltd., and H. P. Staudinger. Nov. 25, 1938. 509,762.

PRODUCING TANTALUM CARBIDE and niobium carbide, more particularly for the production of hard metal.—Vereinigte Edesstahl, A.-G. Jan. 18, 1937. 509,609.

PRODUCTION OF SHAPED ARTICLES from cellulose acetate.—I. G. Farbenindustrie. Jan. 19, 1937. 509,702.

DYEING OR COLOURING PLASTIC MASSES and solutions thereof.—W. W. Groves (I. G. Farbenindustrie.) Jan. 19, 1938. 509,770.

MANUFACTURE OF STABLE PREPARATIONS containing ergometrine.—Naamlooze Vennootschap Orgachemia. Jan. 19, 1937. 509,709.

PROCESS FOR MANUFACTURING GLUCOSE SYRUP.—Naamlooze Vennootschap Octrooien Maatschappij Activit. Jan. 27, 1937. 509,710.

COATED FABRICS and the production thereof.—J. H. McGill, and Imperial Chemical Industries, Ltd. Jan. 19, 1938. 509,711.

MANUFACTURE OF ETHERS of mono-hydroxy-halogen-1 :4-benzoquinones.—W. W. Groves (I. G. Farbenindustrie.) Jan. 20, 1938. 509,890.

MANUFACTURE OF AMINO-ALKOXY-1 :4-BENZOQUINONES and their derivatives.—W. W. Groves (I. G. Farbenindustrie.) Jan. 20, 1938. 509,891.

MANUFACTURE OF KETENE, acetic anhydride, and homologues thereof.—H. Dreyfus. Jan. 20, 1938. 509,777.

MANUFACTURE OF KETENE, acetic anhydride, and homologues thereof.—L. Fallows, and E. V. Mellers. Jan. 20, 1938. 509,778.

PRODUCTION OF PURE ALUMINA.—Dyckerhoff, Portland-Zementwerke, A.-G. Jan. 29, 1937. 509,892.

MANUFACTURE OF SPIRIT PRINTING-INK.—Imperial Chemical Industries, Ltd. Jan. 21, 1937. 509,784.

MANUFACTURE OF 2 :5-DIAMINO-1 :4-BENZOQUINONE DERIVATIVES.—W. W. Groves (I. G. Farbenindustrie.) Jan. 21, 1938. 509,893.

TREATMENT OF RUBBER LATEX.—United States Rubber Products, Inc. Aug. 10, 1937. 509,716.

MANUFACTURE OF DIOXAZINE DYESTUFFS.—W. W. Groves (I. G. Farbenindustrie.) Jan. 22, 1938. 509,898.

TREATMENT OF NATURAL AND ARTIFICIAL FIBRES.—W. W. Groves (I. G. Farbenindustrie.) Jan. 26, 1938. 509,852.

DYEING AND PRINTING MIXTURES OF COTTON and regenerated cellulose.—G. W. Johnson (I. G. Farbenindustrie.) Jan. 27, 1938. 509,790.

MANUFACTURE AND PRODUCTION OF CONDENSATION PRODUCTS.—G. W. Johnson (I. G. Farbenindustrie.) Feb. 25, 1938. 509,796.

PROCESS FOR THE MANUFACTURE OF SULPHINIC ACID DERIVATIVES. Schering, A.-G. March 27, 1937. (Samples furnished.) 509,804.

PRODUCTION OF BASE-EXCHANGE ADSORBENTS stable to temperature changes.—Carbo-Norit-Union Verwaltungs-Ges. March 17, 1937. 509,859.

LEAD ALLOYS.—Goodlass Wall and Lead Industries, Ltd., and W. T. Butcher. April 8, 1938. 509,518.

SOLVENT TREATMENT OF OILS.—Standard Oil Development Co. Aug. 3, 1937. 509,642.

PRODUCTION OF MEDIA for use in paints and impregnating-compositions.—Naamlooze Vennootschap Industrieele Maatschappij Voorheen Noury and Van Der Lande. June 26, 1937. 509,861.

MANUFACTURE AND PRODUCTION OF WATER-SOLUBLE BASIC ALUMINIUM COMPOUNDS.—I. G. Farbenindustrie. May 15, 1937. 509,815.

ELECTRODEPOSITION OF COPPER, and baths therefor.—United Chromium, Inc. July 13, 1937. 509,650.

PROCESS FOR THE MANUFACTURE OF PRODUCTS with foaming, emulsifying, and wetting properties.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. July 21, 1937. (Samples furnished.) 509,871.

CONTINUOUS PRODUCTION OF GLASS having a plurality of layers. Neue Glasindustrie-Ges. July 19, 1937. 509,653.

METHOD OF MANUFACTURING FORMED OF MOULDED ARTICLES from exfoliated vermiculite.—J. A. Babor. July 25, 1938. 509,655.

PRODUCTION OF A BENZINE-SOLUBLE OIL-RESIN SIZE.—C. Mascke. July 27, 1937. 509,538.

PRODUCING ISOBUTANE from normal butane.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Aug. 18, 1937. 509,540.

MANUFACTURE OF QUATERNARY NITROGEN COMPOUNDS.—J. R. Geigy, A.-G. Aug. 20, 1937. 509,542.

PREPARATIONS CONTAINING SOAPS of synthetic fatty acids.—Standard Oil Development Co., and I. G. Farbenindustrie. Sept. 10, 1937. 509,730.

ALLOYS FOR PERMANENT MAGNETS.—Siemens and Halske, A.-G. Sept. 27, 1937. 509,657.

PRODUCTION OF AMINES from esters of amino-alcohols.—T. H. Temmler (trading as Temmler-Werke Vereinigte Chemische Fabriken H. Temmler). Oct. 30, 1937. 509,661.

MANUFACTURE OF ALKALI CELLULOSE.—W. J. Tennant (Dow Chemical Co.). Oct. 6, 1938. 509,662.

REMOVING WEAKLY ACID-REACTING SUBSTANCES from hydrocarbons or derivatives thereof.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Dec. 22, 1937. 509,669.

Company News

English Velvet and Cord Dyers' Association are not paying a dividend on 5 per cent. preference shares for half-year to June 30.

The Celanese Corporation of America reports a net profit for the second quarter of 1939, after providing for all charges, of $1,691,060, making the net profit for the first half of 1939 $3,027,774.

James Howden and Co., Ltd.—At the first general meeting since the company became a public company the report and accounts were unanimously adopted and the dividend of 1s. 6d. per share recommended was approved.

Pharmaceutical Products, Ltd., in their report for the year to March 31 point out that accounts are not comparable with those of the previous year because of the amalgamation of part of the business of the controlling company, Savory and Moore. Profits were £48,221. To reserve for depreciation of investments and loans in subsidiary companies, £1,776, making it £13,000; dividend 40 per cent. (nil); forward, £18,320.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

South Africa.—H.M. Trade Commissioner at Johannesburg reports that the Pretoria Hospital is calling for tenders for the supply and delivery of quantities of drugs, dressings and medical sundries required for the calendar year 1940.

Tenders, endorsed "Tenders for Drugs," should be addressed to the Pretoria Hospital, Pretoria, where they will be received up to 12 noon on Friday, September 8, 1939. (Ref. T. 25242/39.)

Rumania.—A firm in Bucharest wishes to obtain representation, on a commission basis, of United Kingdom manufacturers of plant and other requisites for the oil industry, creosote. (Ref. No. 623.)

Weekly Prices of British Chemical Products

THERE are no special features to record in the general chemical market this week, and business in almost all directions is a little less active as a result of seasonal influences. At the consuming end, however, a fairly substantial movement is maintained and there is no evidence of a falling off in deliveries under existing contracts. The British makers of mercury chloride powder (corrosive sublimate) and mercury chloride B.P. (calomel) announce a reduction of 3d. per lb. in the prices of these items, other mercurial salts remaining unchanged. There are no other price alterations to record and values generally are steady with a firm undertone. Conditions in the coal tar section remain more or less as reported last week, and little change is expected until after the holiday period. A fair inquiry is circulating for toluol and quotations are reported to be steady.

Price Changes

Rises: Copper Sulphate (Manchester); Calcium Cyanamide; Sodium Nitrate.

Falls: Mercury Bichloride Powder, B.P.; Mercury Chloride, B.P. (Calomel); Naphthalene, purified crystals.

MANCHESTER.—Contract deliveries of heavy chemical products in the Lancashire area have been affected to some extent by the holidays and a number of suspensions have been reported during the past week. Allowing for this factor, however, conditions in this respect are reasonably satisfactory, the movement of textile chemicals, in particular, showing some expansion compared with the experience a short time ago. Fresh business this week has been on no more than moderate lines. The general price position remains on a steady basis. With regard to the by-products the demand for the light descriptions is fair and values are maintained, but slow conditions are again reported in the case of pitch and other heavy classes.

General Chemicals

ACETONE.—£39 to £43 per ton, according to quantity.

ACETIC ACID.—Tech., 80%, £30 5s. per ton; pure 80%, £32 5s.; tech., 40%, £15 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. MANCHESTER: 80%, commercial, £30 5s.; tech., glacial, £42 to £46.

ALUM.—Loose lump, £8 7s. 6d. per ton d/d; GLASGOW: Ground, £10 7s. 6d. per ton; lump, £9 17s. 6d.

ALUMINIUM SULPHATE.—£7 5s. 0d. per ton d/d Lancs.

AMMONIA, ANHYDROUS.—Spot, 1s. to 1s. 1d. per lb. d/d in cylinders.

AMMONIUM CARBONATE.—£20 per ton d/d in 5 cwt. casks.

AMMONIUM CHLORIDE (see Salammoniac).—Firsts, lump, spot, £42 17s. 6d. per ton; d/d address in barrels. Dog-tooth crystals, £35 per ton; fine white crystals, £18 per ton, in casks, ex store. GLASGOW: Large crystals, in casks, £37 10s.

AMMONIUM DICHROMATE.—8¼d. per lb. d/d U.K.

ANTIMONY OXIDE.—£68 per ton.

ARSENIC.—Continental material £10 10s. per ton c.i.f., U.K. ports; Cornish White, £12 5s. to £12 10s. per ton f.o.r., mines, according to quantity. MANCHESTER: White powdered Cornish, £15 10s. per ton, ex store.

BARIUM CHLORIDE.—£11 10s. to £12 10s. per ton in casks ex store. GLASGOW: £12 per ton.

BLEACHING POWDER.—Spot, 35/37%, £9 5s. per ton in casks, special terms for contract. GLASGOW: £9 5s. per ton net ex store.

BORAX COMMERCIAL.—Granulated, £16 per ton; crystal, £17; powdered, £17 10s.; extra finely powdered, £18 10s., packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Granulated, £16 per ton in 1-cwt. bags, carriage paid.

BORIC ACID.—Commercial granulated, £28 10s. per ton; crystal, £29 10s.; powdered, £30 10s.; extra finely powdered, £32 10s. in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Crystals, £29 10s.; powdered, £30 10s. 1-cwt. bags in 1-ton lots.

CALCIUM BISULPHITE.—£6 10s. per ton f.o.r. London.

CALCIUM CHLORIDE.—GLASGOW: 70/75% solid, £5 12s. 6d. per ton ex store.

CHARCOAL, LUMP.—£6 to £6 10s. per ton, ex wharf. Granulated, £7 to £9 per ton according to grade and locality.

CHLORINE, LIQUID.—£18 15s. per ton, seller's tank wagons, carriage paid to buyer's sidings; £19 5s. per ton, d/d in 16/17 cwt. drums (3-drum lots); £19 10s. per ton d/d in 10-cwt. drums (4-drum lots); 4⅜d. per lb. d/d station in single 70-lb. cylinders.

CHROMETAN.—Crystals, 2⅝d. per lb.; liquor, £13 per ton d/d station in drums.

CHROMIC ACID.—9d. per lb., less 2½%; d/d U.K.

CHROMIC OXIDE.—11½d. per lb.; d/d U.K.

CITRIC ACID.—1s. 0¼d. per lb. MANCHESTER: 1s. 0¼d. GLASGOW: B.P. crystals, 1s. 0¼d. per lb; less 5%, ex store.

COPPER SULPHATE.—£18 5s. per ton, less 2% in bags. MANCHESTER: £18 15s. per ton f.o.b. GLASGOW: £19 10s. per ton, less 5%, Liverpool in casks.

CREAM OF TARTAR.—100%, £4 12s. per cwt., less 2½%. GLASGOW: 99%, £4 12s. per cwt. in 5-cwt. casks.

FORMALDEHYDE.—£20-£22 per ton.

FORMIC ACID.—85%, in carboys, ton lots, £42 to £47 per ton.

GLYCERINE.—Chemically pure, double distilled, 1,260 s.g., in tins, £3 10s. to £4 10s. per cwt. according to quantity; in drums, £3 2s. 6d. to £3 16s. 0d. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

HYDROCHLORIC ACID.—Spot, 5s. 6d. to 8s. carboy d/d according to purity, strength and locality.

IODINE.—Resublimed B.P., 6s. 9d. per lb. in 7 lb. lots.

LACTIC ACID.—(Not less than ton lots). Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50%, by vol., £41. One ton lots ex works, barrels free.

LEAD ACETATE.—LONDON: White, £31 10s. ton lots; brown, £35. MANCHESTER: White, £31; brown, £30. GLASGOW: White crystals, £29 10s.; brown, £1 per ton less.

LEAD NITRATE.—£27 per ton for 1-ton lots.

LEAD, RED.—£30 15s. 0d. 10 cwt. to 1 ton, less 2½% carriage paid. GLASGOW: £30 per ton, less 2½% carriage paid for 2-ton lots.

LITHARGE.—GLASGOW: Ground, £30 per ton, less 2½%, carriage paid for 2-ton lots.

MAGNESITE.—Calcined, in bags, ex works, about £8 per ton.

MAGNESIUM CHLORIDE.—Solid (ex wharf) £5 10s. per ton. GLASGOW: £7 5s. per ton.

MAGNESIUM SULPHATE.—Commercial, £5 10s. per ton, ex wharf.

MERCURY PRODUCTS.—Ammoniated B.P. (white precip.), lump, 6s. 5d. per lb.; powder B.P., 6s. 7d.; bichloride B.P. (corros. sub.), 5s. 8d.; powder B.P., 5s. 1d.; chloride B.P. (calomel), 6s. 2d.; red oxide cryst. (red precip.), 7s. 6d.; levig, 6s. 9d.; yellow oxide B.P. 6s. 10d.; persulphate white B.P.C., 6s. 7d.; sulphide black (hyd. sulph. cum. sulph. 50%), 6s. 6d. For quantities under 112 lb., 1d. extra; under 28 lb., 5d. extra.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities.

NITRIC ACID.—Spot, £25 to £30 per ton according to strength, quantity and destination.

OXALIC ACID.—£48 15s. to £57 10s. per ton, according to packages and position. MANCHESTER: £49 to £55 per ton ex store. GLASGOW: £2 9s. per cwt. in casks.

PARAFFIN WAX.—GLASGOW: 3¾d. per lb.

POTASH, CAUSTIC.—Solid, £33 5s. to £38 per ton according to quantity, ex store; broken, £40 per ton. MANCHESTER: £38.

POTASSIUM CHLORATE.—£36 7s. 6d. per ton. MANCHESTER: £37 per ton. GLASGOW: 4½d. per lb.

POTASSIUM DICHROMATE.—5¼d. per lb. carriage paid. GLASGOW: 5¼d. per lb., net, carriage paid.

POTASSIUM CHROMATE.—7d. per lb., d/d U.K.

POTASSIUM IODIDE.—B.P. 6s. 3d. per lb. in 7 lb. lots.

POTASSIUM NITRATE.—Small granular crystals, £24 to £27 per ton ex store, according to quantity.

POTASSIUM PERMANGANATE.—LONDON: 9¼d to 10¼d. per lb. MANCHESTER: B.P. 9¼d. to 11¼d. GLASGOW: B.P. Crystals, 10¼d.

POTASSIUM PRUSSIATE.—6d. to 6¼d. per lb. MANCHESTER: Yellow, 6d. to 6¼d.

PRUSSIATE OF POTASH CRYSTALS.—In casks, 6¾d. per lb. net, ex store.

SALT CAKE.—Unground, spot, £3 8s. 6d. per ton.

SODA ASH.—Light 98/100%, £5 17s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, £13 10s. per ton d/d station.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£19-£20 per ton carriage paid North. GLASGOW: £18 10s. per ton net ex store.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags in 1-ton lots. MANCHESTER: £10 15s. GLASGOW: £13 5s. per ton in 1 cwt. kegs, £11 5s. per ton in 2-cwt. bags.

SODIUM BISULPHITE POWDER.—60/62%, £12 10s. to £14 per ton d/d in 2-ton lots for home trade.

SODIUM CARBONATE MONOHYDRATE.—£20 per ton d/d in minimum ton lots in 2 cwt. free bags.
SODIUM CHLORATE.—£27 10s. to £32 per ton. GLASGOW: £1 11s. per cwt., minimum 3 cwt. lots.
SODIUM DICHROMATE.—Crystals cake and powder 4¼d. per lb. net d/d U.K. with rebates for contracts. GLASGOW: 4¼d. per lb., carriage paid.
SODIUM CHROMATE.—4½d. per lb. d/d U.K.
SODIUM HYPOSULPHITE.—Pea crystals, £15 5s. per ton for 2-ton lots; commercial, £11 5s. per ton. MANCHESTER: Commercial, £11; photographic, £15 10s.
SODIUM METASILICATE.—£14 5s. per ton, d/d U.K. in cwt. bags.
SODIUM NITRATE.—Refined, £8 5s. per ton for 6-ton lots d/d. GLASGOW: £1 12s. per cwt. in 1-cwt. kegs, net, ex store.
SODIUM NITRITE.—£18 5s. per ton for ton lots.
SODIUM PERBORATE.—10%, £4 per cwt. d/d in 1-cwt. drums.
SODIUM PHOSPHATE.—Di-sodium, £12 per ton delivered for ton lots. Tri-sodium, £16 10s. per ton delivered per ton lots.
SODIUM PRUSSIATE.—4d. per lb. for ton lots. MANCHESTER: 4¼d. to 5d. GLASGOW: 4d.
SODIUM SILICATE.—£8 2s. 6d. per ton.
SODIUM SULPHATE (GLAUBER SALTS).—£3 per ton d/d.
SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 to £3 10s. per ton d/d station in bulk. MANCHESTER: £3 10s.
SODIUM SULPHIDE.—Solid 60/62%, Spot, £11 15s. per ton d/d in drums; crystals, 30/32%, £9 per ton d/d in casks. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8 10s.
SODIUM SULPHITE.—Pea crystals, spot, £14 10s. per ton d/d station in kegs.
SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.
SULPHURIC ACID.—168° Tw., £4 11s. to £5 1s. per ton; 140° Tw., arsenic-free, £3 to £3 10s.; 140° Tw., arsenious, £2 10s.
TARTARIC ACID.— 1s. 1¼d. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 1s. 1¼d. per lb. GLASGOW: 1s. 1¼d. per lb., 5%, ex store.
ZINC SULPHATE.—Tech., £11 10s. f.o.r., in 2-cwt. bags.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 7½d. to 1s. 2½d. per lb., according to quality. Crimson, 1s. 6½d. to 1s. 8d. per lb.
ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.
BARYTES.—£6 to £6 10s. per ton, according to quality.
CADMIUM SULPHIDE.—3s. 1d. to 3s. 4d. per lb.
CARBON BLACK.—3⅝d. to 4 1/16d. per lb., ex store.
CARBON DISULPHIDE.—£31 to £33 per ton, according to quantity, drums extra.
CARBON TETRACHLORIDE.—£41 to £46 per ton, according to quantity, drums extra.
CHROMIUM OXIDE.—Green, 11½d. per lb.
DIPHENYLGUANIDINE.—2s. 2d. per lb.
INDIA-RUBBER SUBSTITUTES.—White, 4¼d. to 5d. per lb.; dark 3⅝d. to 4⅛d. per lb.
LAMP BLACK.—£24 to £26 per ton del., according to quantity. Vegetable black, £35 per ton upwards.
LEAD HYPOSULPHITE.—9d. per lb.
LITHOPONE.—Spot, 30%, £16 10s. per ton, 2-ton lots d/d in bags.
SULPHUR.—£9 to £9 5s. per ton. SULPHUR PRECIP. B.P., £55 to £60 per ton. SULPHUR PRECIP. COMM., £50 to £55 per ton.
SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quantity.
VERMILION.—Pale, or deep, 5s. per lb., 1-cwt. lots.
ZINC SULPHIDE.—£58 to £60 per ton in casks ex store, smaller quantities up to 1s. per lb.

Nitrogen Fertilisers

AMMONIUM SULPHATE.—The following prices have been announced for neutral quality basis 20.6% nitrogen, in 6-ton lots delivered farmer's nearest station up to June 30, 1940; September, £7 5s.; October, £7 6s. 6d.; November, £7 8s.; December, £7 9s. 6d.; January, 1940; £7 11s., February £7 12s. 6d.; March/June, £7 14s.
CALCIUM CYANAMIDE.—The following prices are for delivery in 5-ton lots, carriage paid to any railway station in Great Britain up to June 30, 1940; September £8 2s. 6d.; October £8 3s. 9d.; November £8 5s.; December, £8 6s. 3d.; January, 1940, £8 7s. 6d.; February £8 8s. 9d.; March £8 10s.; April/June, £8 11s. 3d.
NITRO-CHALK.—£7 10s. 6d. per ton up to June 30, 1940.
SODIUM NITRATE.—£8 5s. per ton for delivery up to June 30, 1940.
CONCENTRATED COMPLETE FERTILISERS.—£11 4s. to £11 13s. per ton in 6-ton lots to farmer's nearest station.
AMMONIUM PHOSPHATE FERTILISERS.—£10 19s. 6d. to £14 16s. 6d. per ton in 6-ton lots to farmer's nearest station.

Coal Tar Products

BENZOL.—At works, crude, 9½d. to 10d. per gal.; standard motor, 1s. 3½d. to 1s. 4d.; 90%, 1s. 4½d. to 1s. 5d., pure 1s. 8½d. to 1s. 9. MANCHESTER: Crude, 1s. 0½d. to 1s. 0¾d. per gal.; pure, 1s. 8d. to 1s. 8½d. per gal.; motor grade 1s. 6½d.
CARBOLIC ACID.—Crystals, 6¾d. to 7¼d. per lb., small quantities would be dearer; Crude, 60's 1s. 7d. to 1s. 10d.; dehydrated, 2s. 6d. per gal., according to specification; Pale, 99/100%, per lb. f.o.b. in drums; crude, 2s. 1d. per gal.
CREOSOTE.—Home trade, 3¾d. to 4d. per gal., f.o.r., makers' works; exports 6d. to 6¼d. per gal., according to grade. MANCHESTER: 3¼d. to 4½d.
CRESYLIC ACID.—97/99%, 1s. 5d. to 1s. 8d.; 99/100%, 2s. to 2s. 6d. per gal., according to specification. MANCHESTER: Pale, 99/100%, 1s 5d. to 1s. 6d.
NAPHTHA.—Solvent, 90/160, 1s. 6d. to 1s. 7d. per gal.; solvent, 95/160%, 1s. 7d. to 1s. 8d., naked at works; heavy 90/190%, 1s. 1½d. to 1s. 3d. per gal., naked at works, according to quantity. MANCHESTER: 90/160%, 1s. 5d. to 1s. 7d. per gal.
NAPHTHALENE.—Crude, whizzed or hot pressed, £5-£6 per ton; purified crystals, £9 per ton in 2-cwt. bags. LONDON: Fire lighter quality, £3 to £4 10s. per ton. MANCHESTER: Refined, £10 10s. to £11 10s. 0d. per ton f.o.b.
PITCH.—Medium, soft, 26s. per ton, f.o.b. MANCHESTER: 24s. f.o.b., East Coast.
PYRIDINE.—90/140%, 12s. 6d. to 14s. per gal.; 90/160%, 10s. 6d. to 11s. 6d. per gal.; 90/180%, 3s. to 4s. per gal. f.o.b. MANCHESTER: 10s. 6d. to 14s. per gallon.
TOLUOL.—90%, 2s. 1d. to 2s. 2d. per gal.; pure 2s. 5d. to 2s. 6d. MANCHESTER: Pure, 2s. 5d. per gallon, naked.
XYLOL.—Commercial, 2s. 3d. per gal.; pure, 2s. 5d. MANCHESTER: 2s. 4d. per gallon.

Wood Distillation Products

CALCIUM ACETATE.—BROWN, £6 15s. to £9 5s. per ton; grey, £8 to £8 5s. MANCHESTER: Brown, £8; grey, £9 10s.
METHYL ACETONE.—40.50%, £32 to £35 per ton.
WOOD CREOSOTE.—Unrefined, 6d. to 8d. per gal., according to boiling range.
WOOD NAPHTHA, MISCIBLE.— 2s. 8d. to 3s. per gal;. solvent, 3s. to 3s. 5d. per gal.
WOOD TAR.—£3 to £8 per ton, according to quality.

Intermediates and Dyes

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
BENZALDEHYDE.—1s. 10d. per lb., for cwt. lots, net packages.
BENZIDINE, HCl.—2s. 7½d. per lb., 100% as base, in casks.
BENZOIC ACID, 1914 B.P. (ex toluol).—1s. 11d. per lb. d/d buyer's works.
m-CRESOL 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.
o-CRESOL 30/31° C.—6½d. to 7½d. per lb. in 1-ton lots.
p-CRESOL 34/35° C.— 1s. 7d. to 1s. 8d. per lb. in ton lots.
DICHLORANILINE.—2s. 1½d. to 2s. 5½d. per lb.
DIMETHYLANILINE.—Spot, 1s. 7½d. per lb., package extra.
DINITROBENZENE.—7½d. per lb.
DINITROCHLORBENZENE, SOLID.—£79 5s. per ton.
DINITROTOLUENE.—48/50° C., 8½d. per lb.; 66/68° C., 11d.
DIPHENYLAMINE.—Spot, 2s. 3d. per lb.; d/d buyer's works.
GAMMA ACID, Spot, 4s. 4½d. per lb. 100%, d/d buyer's works.
H ACID.—Spot, 2s. 7d. per lb.; 100%, d/d buyer's works.
NAPHTHIONIC ACID.—1s. 10d. per lb.
β-NAPHTHOL.—£97 per ton; flake, £94 8s. per ton.
α-NAPHTHYLAMINE.—Lumps, 1s. 1d. per lb.
β-NAPHTHYLAMINE.—Spot, 3s. per lb.; d/d buyer's works.
NEVILLE AND WINTHER'S ACID.—Spot, 3s. 3½d. per lb. 100%.
o-NITRANILINE.—4s. 3½d. per lb.
m-NITRANILINE.—Spot, 2s. 10d. per lb. d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 10d. to 1s. 11d. per lb. d/d buyer's works.
NITROBENZENE.—Spot, 4½d. to 5d. per lb., in 90-gal. drums, drums extra, 1-ton lots d/d buyer's works.
NITRONAPHTHALENE.—9½d. per lb.; P.G., 1s. 0½d. per lb.
SODIUM NAPHTHIONATE.—Spot, 1s. 11d. per lb.; 100% d/d buyer's works.
SULPHANILIC ACID.—Spot, 8¾d. per lb. 100%, d/d buyer's works.
o-TOLUIDINE.—10½d. per lb., in 8/10 cwt. drums, drums extra.
p-TOLUIDINE.—1s. 10½d. per lb., in casks.
m-XYLIDINE ACETATE.—4s. 3d. per lb., 100%.

Latest Oil Prices

LONDON, August 2.—LINSEED OIL was firm. Spot, £26 10s. per ton (small quantities); Aug., £24 2s. 6d.; Sept.-Dec., £23 12s. 6d.; Jan.-April, £23 7s. 6d., naked. SOYA BEAN OIL was quiet. Oriental, Aug.-Sept. shipment, c.i.f., bulk, £17 15s. per ton. RAPE OIL was dull. Crude extracted, £31 10s. per ton; technical refined, £32 15s., naked, ex wharf. COTTON OIL was steady. Egyptian crude, £17 5s. per ton; refined common edible, £20 5s.; deodorised, £22 5s., naked, ex mill (small lots £1 10s. extra). TURPENTINE was quiet. American, spot, 33s. per cwt.; Aug. delivery, 32s. 9d.

HULL.—LINSEED OIL, spot, £24 15s. per ton; Aug., £24 5s.; Sept.-Dec., £23 10s.; Jan.-April, £23 7s. 6d. COTTON OIL, Egyptian crude, spot, £16; edible refined, £19; technical, £19; deodorised, £21, naked. PALM KERNAL OIL, crude, f.m.q., spot, £17 naked. GROUNDNUT OIL, extracted, spot, £23; deodorised £26. RAPE OIL, extracted, spot, £30 10s.; refined, £31 10s. per ton. SOYA OIL, extracted, spot, £25 10s.; deodorised, £28 10s. per ton. COD OIL, f.o.r. or f.a.s., 25s., per cwt., in barrels. CASTOR OIL, pharmaceutical, 39s.; first, 34s.; second, 32s. TURPENTINE, spot, 34s. 3d. per cwt.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

BRITISH SOLVENT OILS, LTD., Manchester. (M., 5/8/39. July 20, £1,000 mortgage (sec. 81, 1929 Act), to Constance M. Rylands, Wallington; charged on Victoria Works, Mount Street, Accrington, etc.

E. WOOD, LTD., London, E., paint, etc., manufacturers. (M., 5/8/39.) July 21, charge, to Chartered Bank of India Australia and China, securing all moneys due or to become due to the Bank; charged on properties, at Stephenson Street, Junction Street and Wharf Street, Canning Town. * Nil. June 2, 1939.

Receiverships

WESSEX METAL AND CHEMICAL CO., LTD., Westbury (Wilts.) (R., 5/8/39.) A. Collins, 28 Baldwin Street, Bristol, 1, has been appointed receiver and manager. July 20.

Books Received

Uses of Lac. By H. K. Sen and S. Ranganathan. India, Namkum: Indian Lac Research Institute. Pp. 78. Re.1/4/-.

General Science for Schools. Vol III. By F. Sherwood Taylor. London: William Heinemann. Pp. 271. 3s.

Micro-Diffusion Analysis and Volumetric Error. By Edward J. Conway. London: Crosby Lockwood and Son, Ltd. Pp. 306. 25s.

New Companies Registered

International Casein, Ltd.—355,296. Private company. Capital, £500 in 500 shares of £1 each. To acquire and turn to account any invention or process relating to the production of casein or other chemicals, etc. Subscribers: Evelyn Smith, 10 Norfolk Street, W.C.2; Doris E. Nixon.

Ward Blenkinson & Co., Ltd. 354,672, private company.—Capital: £50,000 in 50,000 ordinary shares of £1 each. To carry on the business of manufacturing, analytical and consulting chemists, druggists, drysalters, oil and colour men, manufacturers of and dealers in pharmaceutical and other preparations, chemicals, oils, paints, pigments and varnishes, manufacturers of explosives, etc. Directors: Edward Bruce Ward, 25a Grove End Road, N.W.8; Henry M. Blenkinsop.

Geo. F. Boome & Son, Ltd. 354,178.—Private company. Capital £2,000 in 2,000 shares of £1 each. To acquire the business of a chemical manufacturer carried on by Arthur H. Boome, trading as "Geo. F. Boome and Son," at Star Chemical Works, Watts Grove, Bow, E.3. Directors: Arthur H. Boome, St. Martins, 9 Park Avenue, Woodford Green, Essex; Mrs. Ellen M. Boome, Leonard C. Pedder. Registered office: Star Chemical Works, Watts Grove, Bow, E.3.

Jenolite, Ltd., 354,756.—Private company. Capital: £100 in 100 shares of £1 each. To carry on the business of manufacturers, producers, wholesalers and retailers of all kinds of chemicals and chemical preparations, including rust preventive varnishes, lacquers, paints, enamels, disinfectants, cleansing preparations, medicinal, laundry, sanitary and toilet preparations, etc. Directors: Max Bernhard, "Creenshoe," Chatsworth Road, Eccles, Lancs.; John H. Jarman. Registered office: 13 St. Ann Street, Manchester.

Sulfuro Fertilizers, Ltd.—355,211. Private company. Capital, £20,000 in 20,000 shares of £1 each. To carry on the business of manufacturers of and dealers in fertilisers, manures, chemicals, corn, grain, meal, flour, seed, hay, straw, fodder, flax, cotton, animal foods, stearin, saccharine, fats and food products of every description, general merchants and manufacturing chemists and druggists, etc. Directors: Charles H. Gillbard, The Ranch, Launceston; John Ray, Adolphus Sobey.

Certus Chemical Industries, Ltd., 9,823, a public company registered in Dublin. Capital: £1,000 in 4,000 ordinary shares of 5s. each. To carry on in Eire or elsewhere the business of manufacturers and sellers, either wholesale or retail, of chemical or veterinary products, dealers in other articles usually or conveniently made by manufacturing chemists. Subscribers: Miss Gretta Phillips, 51 The Rise, Mount Merrion Park, Blackrock, Co. Dublin; Charles Stewart, David Phillips, Arthur McCormack, Miss Margaret Soden, Miss Francis H. O'Neill, Miss Margaret Adamson.

Chemical and Allied Stocks and Shares

DESPITE the further large decline in the unemployment figures and a number of encouraging trade factors, the new Stock Exchange account has not brought any improvement in business to the stock and share markets. Nevertheless shares of companies identified with the chemical and allied industries were not without individual features of interest and in some cases prices are higher on balance.

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Imperial Chemical at 29s. 7½d. showed a gain of 10½d. on the week, while the preference units improved from 28s. 7½d. to 29s. 9d. Rather more attention was given to B. Laporte, which have been marked up from 58s. to 61s. Fison Packard continued firm and transferred around 41s. 6d. Lever and Unilever at 34s. were unchanged, while British Oil and Cake Mills preferred ordinary were slightly better at 40s. Swedish Match kept at 24s. 3d., while British Match were 6d. higher at 34s. 6d. Borax Consolidated deferred were subject to moderate fluctuations, but on balance for the week showed an improvement from 20s. 6d. to 21s. Blythe Colour Works were rather more active, and although "ex" the interim dividend, were 7s. 9d. compared with 7s. 6d. a week ago. Pinchin Johnson failed to keep best prices touched during the past few days, but were better on the week at 23s., compared with 22s. International Paint improved from 79s. 4½d. to 80s. 7½d. British Glues held their recent rise to 5s. and the participating preference shares were 24s. 6d.

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Triplex Glass were lowered from 38s. to 37s. awaiting the impending dividend announcement. Other shares of glass manufacturers were inactive, but United Glass Bottle moved up to 48s. 9d. General Refractories were steady around 7s. 3d., while United Molasses were little changed at 24s. 6d. British Industrial Plastics 2s. shares were again quoted at 1s. 6d., and low temperature Carbonisation 2s. units at 1s. 9d. held most of the improvement shown a week ago. Thomas De La Rue moved up to 63s. 9d. Timothy Whites and Taylors rallied from 22s. 4½d. to 22s. 10½d., and Boots Drug were 43s. against 41s. 6d. a week ago. Sangers were slightly higher at 20s. 9d., and British Drug Houses kept at 21s. 6d.

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In the textile group, cotton textile shares were slightly lower, but rayon shares held most of their recent rally and Courtaulds were 21s. compared with 30s. a week ago. The market is continuing to talk of the possibility of a scheme to fund the outstanding arrears of dividend on British Celanese second preference shares, although the general belief is that any development of this kind would probably be left until publication of the year's results.

Some attention was given to Clarke Chapman on hopes of a possible resumption of interim dividend payments, while Babcock and Wilcox were higher at 47s. compared with 45s. 9d. a week ago, and Hopkinsons were also better. Pressed Steel improved. Stewarts and Lloyds gained 1s. to 44s., and Stanton Ironworks were 53s. 9d. compared with 53s. Guest Keen rallied from 24s. 9d. to 25s. 3d., while Dorman Long made the slightly better price of 29s. 1½d. Neepsend Steel and Tool were active, but were lower at 76s. 9d. following the deduction of the final dividend and bonus, which made a total distribution of 47½ for the year and was up to best market expectations. Distillers were firm and have risen on the week from 95s. 9d to 97s. 9d.

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British Aluminium were favoured, awaiting the interim dividend announcement, and on balance have moved up further from 56s. 9d. to 58s. 3d. Although, as in many other instances, best prices recorded in the past few days were not held, Associated Cement were 71s. 3d. compared with 68s. 9d. a week ago, and British Plaster Board were a few pence higher at 30s. 7½d. Barry and Staines improved from 31s. 6d. to 32s., and Michael Nairn from 53s. 1½d. to 53s. 9d. Dunlop Rubber were higher at 29s. 6d. on talk of a resumption of interim dividend payments, which, however, is not generally expected in the market. As compared with a week ago British Oxygen improved from 79s. 4½d. to 80s. 7½d., and Turner and Newall from 79s. 6d. to 80s. 9d. Anglo-Iranian, "Shell," and other oil shares showed a reactionary trend this week.